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**Report of Project #3, 1954-55, and Project #2, 1955-56,
Food Administration Section
The American Dietetic Association**

Labor Hours in the Dietary Department

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BECAUSE OF THE increase in labor costs and the apparent lack of qualified personnel, those responsible for the management of the food service in institutions are interested in the efficient utilization of labor time.

Dietitians have been and are interested in current policies and practices which affect labor time required for operation of the hospital dietary department. A study of labor policies and practices in nonprofit institutions was one of the projects of the Administration Section of The American Dietetic Association in 1937 (1). A survey of 231 hospitals indicated a wide range of practices for each of several labor policies studied. It was suggested that similar studies be conducted from time to time to present current information regarding labor hours in the dietary department.

In 1947 a project of the Food Administration Section included a study of the number and classification of professional and non-professional personnel required for the efficient operation of dietary departments in various sizes and kinds of institutions. The summary of the report, which is in the files of the Food Administration Section, indicates that, in 1947, there was variation in policies regarding the number of personnel in the dietary departments of institutions of various sizes. The hours of work per week in hospitals were being decreased gradually, the average at that time being 45 hr. There was an apparent trend to place personnel on straight shifts. Again, the section chairman suggested that studies regarding labor policies be continued and that the information be made available to members.

In 1954, because of apparent continued interest and concern about the efficient utilization of labor time as a means of decreasing labor costs in the hospital dietary department, a study of labor hours was initiated as a Food Administration Section project. This project was continued during 1955-56, and the findings are summarized here.

1954-55 Project

The chairman of the Food Administration Section of each state dietetic association was asked to obtain information from hospitals of various sizes. A questionnaire was used for determining some basic information regarding trends in organization and management which might affect the amount of labor time required in the hospital dietary department. Data were obtained in 1954-55 from 309 questionnaires returned by thirty-three state associations. Except for a few of the hospitals with more than 800 beds, most were short-term hospitals where patients usually stay less than thirty days.

When the hospitals were grouped according to regions of the United States as well as according to bed capacity, there seemed to be no definite pattern of practices in organization and management which were typical for any particular region.

Table 1 shows some trends in the organization and management of the dietary departments of the 309 hospitals, divided into eight groups according to bed capacity. The number of beds in a hospital was not always an indication of the total number of meals served daily to either patients or personnel. The average daily patient census in the smaller hospitals often was considerably lower than the bed capacity. Differences between hospitals in policies regarding the service of meals to personnel, students, staff, and guests apparently accounted for the wide variation in the number of meals served to nonpatients in hospitals with similar bed capacity.

[1]Byrdine H. Tuthill, Project Chairman, and Rheta McCutchin, assisted in collecting and analyzing the data presented.

TABLE 1 Organization and management of hospital dietary departments reported in 1955

BED CAPACITY	NUMBER OF HOSPITALS	PATIENT MEALS PER DAY	PERSONNEL MEALS PER DAY	CENTRALIZED SERVICE	SELECTIVE MENUS	40-HR. WORK WEEK	STRAIGHT SHIFT	EMPLOYEES		
								Dietitians	Clerical	Others*
		range	*range*	%	%	%	%	*range*	*range*	*range*
0– 49	32	24– 130	3– 90	81	28	22	68	0– 2	0– 1	0– 3
50– 99	33	84– 279	0– 170	85	24	36	72	0– 3	0– 1	0– 1
100– 199	68	185– 555	70– 800	70	28	54	56	1– 4	0– 3	0– 4
200– 299	60	360– 900	30–1,125	41	35	56	76	1–11	0–10	0–10
300– 399	37	605– 1,395	100–2,300	51	57	65	87	1–20	0– 8	0– 8
400– 499	15	807– 1,385	170–2,000	53	20	66	93	1– 9	0– 4	1–10
500– 799	29	945– 2,100	166–2,600	21	24	93	76	2–20	0– 6	0–13
800–7,500	29	1,567–22,528	240–4,000	14	21	72	65	1–22	0–10	0–24
Total	309	24–22,528	3–4,000	53†	31†	53†	78†	0–22	0–10	1–24

*Dietetic interns and food service supervisors.
†Average.

As would be expected, a majority of the hospitals with less than 200 beds used centralized service. In general, as the hospitals increased in bed capacity, the number using centralized service decreased.

In 31 per cent of the 309 hospitals, selective menus were used for all patients. The hospitals with bed capacities of 200 to 299 and 300 to 399 reported 35 and 57 per cent respectively using selective menus. The range for all groups was from 20 per cent for hospitals with 400 to 499 beds to 57 per cent for those having 300 to 399 beds.

Most of the dietary personnel, in more than half of the 309 hospitals were working 40 hr. a week. The personnel in less than one-fourth of the smaller hospitals worked longer hours. Except for the group of hospitals with more than 800 beds, the number with a 40-hr. week increased as the bed capacity increased.

The majority of employees in 78 per cent of all hospitals in the study worked straight shifts. The lowest percentage working straight shifts was in the 100- to 199-bed capacity group and the highest in the 400- to 499-bed capacity group.

Bed capacity seemed to be no indication of the number of dietitians, clerical help, or other supervisory personnel required or used. All hospitals, however, with 100 beds and over had at least one dietitian. In some hospitals, regardless of size, the hospital dietary department employed no clerical help. The number and type of other supervisory personnel depended probably on the organization of the dietary department and the educational services and practices of the hospital.

It was apparent that it would be desirable to have more information about factors which might affect the labor time used in order to evaluate the data. It seemed feasible to attempt to obtain data with which to determine the average time scheduled daily for dietary personnel in relation to the number of meals served. It was hoped that the findings might provide a guide for determining whether the amount of time being used in an established department was excessive or not, as well as a basis for planning the number of man-hours of labor necessary for a newly organized department.

1955-56 Project

For the 1955-56 project, the questionnaire used was one which had been developed by Halter (2) for a statistical study of labor time in a sample of short-term hospitals in the East North Central Region. On the basis of information obtained from a study by Tuthill and Donaldson (3), this questionnaire had been developed so that it would be brief and simple to answer and would include possible checks for adequacy and accuracy of the data. It included factors which have been suggested as affecting labor time and which could be measured objectively.

In order to include hospitals representing all sections of the United States as well as hospitals of various sizes, the chairman of the Food Administration Section in each state dietetic association was asked to obtain information for this study from at least one hospital in each of the following bed capacity groups:

0- 49 beds
50- 99 beds
100-199 beds
200-299 beds
300-399 beds
400 plus beds

Questionnaires were returned from 237 hospitals in thirty-three states, the Territory of Hawaii, and the District of Columbia. Every region of the nation was represented, and there was a good distribution of hospitals of various sizes. Except for a few of the hospitals with more than 800 beds, the majority were short-term institutions. The range in bed capacity was 24 to 3400 and in number of meals served 56 to 6741. Because the information on twelve of the questionnaires was incomplete, data from only 225 were tabulated.

TABLE 2 **Organization and management of hospital dietary departments reported in 1956**

BED CAPACITY	NUMBER OF HOSPITALS	OCCUPANCY	TOTAL MEALS PER DAY	CENTRALIZED SERVICE	SELECTIVE MENUS	MODIFIED DIETS	40-HR. WORK WEEK	STRAIGHT SHIFT	LABOR TURNOVER
		% range	*range*	*%*	*%*	*% range*	*%*	*%*	*% range*
0– 49	14	50– 91	56– 153	100	7	0–33	36	86	0– 60
50– 99	25	23– 94	126– 516	68	28	6–75	32	80	0–100
100– 199	48	41– 97	173– 985	54	19	1–65	48	57	0–114
200– 299	53	60– 95	560–2,116	45	38	9–48	58	66	6–127
300– 399	37	61–100	791–2,635	32	35	7–68	65	81	0–137
400– 499	15	71–100	1,367–2,905	27	27	11–56	53	87	8–100
500– 799	18	73–100	1,630–3,591	11	33	2–55	50	67	2–125
800–3,400	15	73–100	2,425–6,741	0	20	2–53	67	93	1–100
Total	225	23–100	56–6,741	44*	28*	0–75	51*	72	0–137

*Average.

It has often been assumed that for hospitals of a certain bed capacity there are some characteristics or trends typical for the organization of the dietary department and which might affect labor time. Consequently, some data were tabulated according to bed capacity of the hospital.

Table 2 shows some of the trends in the organization and management of the 225 dietary departments. Information regarding bed capacity in relation to the number of meals served was similar to that obtained the previous year. Bed capacity was not always an indication of the total number of meals served daily. The average number of beds occupied daily in relation to the total bed capacity and the variation between hospitals in policies regarding the service of meals to persons other than patients accounted for variation in total number of meals served among hospitals with similar bed capacity.

The average number of beds occupied daily in relation to total bed capacity is referred to as "percentage occupancy" in Table 2. It was interesting that, in general, as the bed capacity increased the percentage occupancy increased. The range in average percentage occupancy for the 225 hospitals was 23 to 100 with a median of 83. In two-thirds of the hospitals, the percentage occupancy was above 75.

Again, as in the 1955 study, a majority of the hospitals with less than 200 beds used centralized service, and as the bed capacity increased, the percentage using service other than centralized increased. In 16 per cent of the hospitals, a combination of centralized and decentralized services was used for patient food service. At least 24 per cent of the hospitals with 300 or more beds used this combination type service.

Selective menus were used for all patients in 28 per cent of the 225 hospitals included in the 1956 study. The range was from 7 per cent for hospitals with less than 50 beds to 38 per cent for those having 200 to 299 beds. Selective menus were used in one-third or more of the hospitals in the groups having 200 to 299, 300 to 399, and 500 to 799 beds.

The range in percentage of modified diets was from none in some hospitals with less than 50 beds to 75 per cent in some with 50 to 99 beds. The median was 24 per cent. In two-thirds of the hospitals, the percentage of modified diets fell between 11 and 35.

The dietary personnel in 51 per cent of the hospitals were working 40 hr. per week in 1956, compared with 53 per cent in the 1955 study. In more of the hospitals with less than 200 beds, employees worked longer than 40 hr. per week, usually 44 or 48.

The majority of workers in 72 per cent of all the hospitals worked straight shifts. This was slightly lower than the 78 per cent reported in 1955. The lowest percentages working straight shifts were in the 100- to 199- and 200- to 299-bed capacity groups. For all groups other than those with 100 to 199 beds, two-thirds or more of the hospitals scheduled a majority of personnel on straight shifts.

Labor turnover percentage for employees other than professional and clerical was determined by dividing the total number of employees replaced during the current year by the average number of employees on the staff. The range in labor turnover was zero to 137 per cent with a median of 32 per cent. For two-thirds of the hospitals, the range was between 12 and 62 per cent.

Labor Time per Meal Served

To determine the average of "total" labor time scheduled per day for dietary personnel, the total hours scheduled for all professional and non-professional employees for one week were divided by seven. For "direct" labor time, only that time scheduled for non-professional employees who were directly associated with the preparation, service, and cleaning involved in food production was included.

To determine the average per-meal labor time scheduled for dietary personnel for each hospital, the average numbers of total and direct labor hours were converted to minutes and each divided by the average number of meals served daily. This included

TABLE 3 Direct and total per-meal labor times for hospitals classified according to number of meals served

MEALS SERVED DAILY	BED CAPACITY	NUMBER OF HOSPITALS	DIRECT LABOR TIME		TOTAL LABOR TIME	
			Range	Average	Range	Average
			min./meal	*min./meal*	*min./meal*	*min./meal*
56– 199	24– 100	20	10.5–26.4	16.7	13.1–32.0	20.3
200– 299	53– 120	17	10.2–23.8	17.0	11.5–26.1	19.6
300– 399	85– 160	13	8.4–23.5	16.2	9.9–25.6	19.1
400– 499	85– 180	10	11.0–26.5	18.3	12.1–34.3	21.7
500– 599	96– 200	13	9.1–18.3	15.3	11.2–21.0	18.0
600– 699	150– 224	12	6.0–22.7	15.0	8.7–29.1	17.8
700– 899	150– 300	17	11.0–27.6	17.7	12.0–28.7	20.3
900–1,099	195– 395	22	7.0–22.3	16.1	7.8–28.3	19.1
1,100–1,299	210– 396	19	9.0–22.9	15.8	11.5–27.8	18.1
1,300–1,499	250– 481	18	9.3–18.8	13.8	9.9–28.0	16.6
1,500–1,999	250– 490	28	9.1–26.7	14.9	12.7–29.1	17.4
2,000–2,999	250– 800	17	4.8–18.3	12.5	6.8–21.0	14.2
3,000–6,741	500–3,400	19	3.7–23.6	11.5	4.1–23.9	13.1
Total	24–3,400	225	3.7–27.6	14.0	4.1–34.3	16.3

TABLE 4 Some factors which might have accounted for extremes in labor time

FACTORS	HOSPITALS			
	Low labor Time		High labor Time	
	no.	*%*	*no.*	*%*
Number of hospitals in group	48	100	43	100
Less than 83% occupancy	26	46	26	60
Selective menus used for all patients	12	25	15	35
More than 24% modified diets	19	40	23	53
40-hr. work week for the majority of personnel	20	42	21	49
Straight shift for the majority of personnel	41	85	29	67
More than 32% labor turnover	21	44	17	40
Coffee service provided for guests and personnel	24	50	29	67
Formula room service provided	5	10	9	21
Tray service and housekeeping services provided by non-dietary personnel	40	83	30	70
In-service training program provided	13	27	17	40
More than 2.3 min. per meal used for other than direct labor	13	27	33	77

meals served to patients, students, personnel, guests, and staff. Thus "total" labor time per meal represents the average number of minutes scheduled per meal for all personnel of the dietary department, including both non-professional and professional, clerical, and students. "Direct" labor time per meal represents the time scheduled for non-professional personnel directly associated with all phases of food production and service.

Table 3 shows the ranges in bed capacity, the number of hospitals in each group, and the range and average for direct and total labor time when the hospitals were classified according to the number of meals served daily. Again, there is evidence that bed capacity is not always an indication of the number of meals served and is not a reliable basis for determining the man-hours of labor required for the dietary department. It would seem more reasonable to consider the number of meals served daily as well as the type and number of other services provided by the dietary department.

The range in direct labor time for 225 hospitals was 3.7 to 27.6 min. per meal; the average was 14 min. The range in total labor was 4.1 to 34.3 min. per meal, and the average was 16.3 min. When the hospitals were classified according to the number of meals served, there was a wide range in labor time among the hospitals in each group. Labor time did not decrease as the number of meals served increased.

It was interesting that the difference between the average direct and average total labor time for the 225 hospitals was 2.3 min. This indicated the average amount of labor time scheduled for professional, clerical, and other personnel not directly involved with food production and service. The range in time used by personnel for other than direct labor was from 1.6 min. per meal for hospitals serving more than 3000 meals to 3.4 min. for those serving 400 to 499 meals. In general, when the time used for professional and clerical staff was above the average, the hospital was an educational institution which provided training for medical students and interns, nurses, dietetic interns, and other groups.

Factors Affecting Labor Time

To determine whether certain trends in the organization and management of the dietary departments might have accounted for the variation in labor time, data from hospitals with extremely high or low labor time were tabulated and studied. Those hospitals for which the total labor time per meal

deviated more than 4 min. plus or minus the average of the time for each group when classified according to number of meals served were considered to have extremely high or low labor time.

In 48 of the 225 hospitals, the total labor time per meal served was low and in 43, the time was high. In the remaining 134, or 60 per cent, the range in total labor time was 9.1 to 25.7 min. per meal served. The hospitals with extremely high or low labor times represented every region of the Unitd States. There seemed to be no one state or group of states with extremes in labor time. Some hospitals in every group, when classified according to number of meals served, were among the extremes.

Some factors which might have accounted for the extremes in labor time and the variation from the time for the majority of hospitals in a group serving a similar number of meals were considered. Data regarding these factors are shown in Table 4. Certain assumptions often are made about the possible reasons for variation in labor time required for efficient management of the dietary department. The degree to which the following factors might increase labor time has been questioned: low percentage occupancy, the use of selective menus for all patients, large percentage of modified diets, a 40-hr. work week, straight shifts for the majority of employees, high labor turnover, special services provided by the department, and the lack of planned in-service training for personnel.

Table 4 shows that when comparing factors which might have caused high or low labor times, a greater percentage of hospitals with high labor time reported a percentage occupancy lower than the median of 83 per cent. A greater percentage of the hospitals with high labor time used selective menus for all patients, served more than the median percentage of modified diets, scheduled a 40-hr. work week for a majority of personnel, provided coffee service for personnel and guests as well as formula room service and in-service training programs. More than 2.3 min. per meal were scheduled for other than direct labor in a larger percentage of the hospitals with high labor time. In a lower percentage of the hospitals with high labor time, however, straight shifts were scheduled for personnel, turnover rates were higher than the median, and tray service and some housekeeping duties were provided by non-dietary personnel.

Summary and Conclusions

During 1954-55 a project was initiated to study the use of labor time in the hospital dietary department. Information from questionnaires returned by thirty-three state dietetic associations from 309 hospitals was tabulated and used as a guide for continuing the study. During 1955-56, data were obtained from 225 hospitals.

The range in direct labor time was 3.7 to 27.6 min. per meal; the average was 14 min. The range in total labor time was 4.1 to 34.3 min. per meal, with an average of 16.3. Factors which might have caused extremes in labor time were analyzed.

On the basis of the data obtained from these questionnaires, it would be difficult to determine the specific factor or factors responsible for increasing or decreasing labor time in any one hospital. It is recognized that a combination of several factors, in addition to those measured objectively for this study, might have affected labor time. Some of these are: amount and type of facilities, physical plant layout, amount and type of equipment, type of personnel, and the amount and kind of supervision.

The figures presented in this report can serve as a guide for evaluating labor time scheduled in hospital dietary departments or for determining the man-hours of labor necessary for a newly organized department. The findings of other studies of labor time in the hospital dietary department have been reported (2, 4, 5). Methods used in various studies and the data obtained can help the dietitian who plans an evaluation of labor time. Each person using such information will need to consider the specific factors in her department which might affect the amount of labor time required for efficient production and service of food.

It is recommended that labor time should be evaluated in individual hospitals and specific ways of using the time more effectively be studied and applied. An exchange and summary of the results of similar studies could describe, for other dietitians, specific policies and practices which have been effective for controlling labor time in some hospital dietary departments.

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Education apparently has a great influence on the use of medical services for maternity care. The Health Information Foundation reports that 90 per cent of mothers with some college training see a doctor at least once during the first three months of pregnancy, compared with 40 per cent of those with only eight years or less of schooling.

Composition and Nutritive Importance of Eggs

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THE regular use of eggs by many American families and numerous questions which have been raised concerning the over-all contribution of this food to the nutritional soundness of the diet have been responsible for the writing of this review. It is hoped that bringing together widely scattered data on composition, pointing up knowledge of the variation that may occur in the composition of eggs depending on the feed and storage conditions, and bringing out some of the highlights of our knowledge about avidin and cholesterol will enable the reader to have a better understanding of the total nutritive value of this food.

On an average, approximately one-tenth of the protein needs of the adult population are being met from egg proteins. As a source of iron, vitamins A and D, and riboflavin, eggs are an important food. Many other essential factors are furnished in significant amounts due to their daily use on the part of a large population.

As is true for many processed foods, certain major vitamin losses may occur during preparation, holding, or cooking. This is true in the case of pyridoxine losses during storage, folic acid losses during cooking, or vitamin A losses when dried yolk or whole egg are held under adverse conditions. These changes in nutritive value are in agreement with losses occurring in other foods for a given treatment.

The presence of avidin in unheated egg white, a substance known to render biotin unavailable, appears to be of little importance from the standpoint of the general nutrition of the public. Special situations may occur when supplementation with biotin may be beneficial, but these cases are apt to be rare and limited to hospital feeding. Similarly, the presence of cholesterol in egg yolk, which has been looked on with suspicion for many years, appears to have little relationship to the serum cholesterol level in human subjects according to current research.

These facts lead to the conclusion that eggs make an important contribution to the American diet and their increased use might well be encouraged to improve the nutritional status of portions of our population.

The per capita consumption of eggs for the United States was 366 in 1955, 122 per cent of the intake during 1935-39 (1). This regular use of eggs in the American diet has steadily increased, reaching a plateau within the last few years. The popularity of eggs shown on the part of the American public and the increased knowledge of the nutrients furnished from this food have caused a re-examination of the contribution of eggs to the diet. The present review brings together scattered information dealing with the concentration of essential factors found in eggs; the influence of storage, processing, and cooking on nutrient stability; the availability or utilization of certain factors occurring therein; as well as some discussion of the significance of two substances not widely distributed among other common foods, namely avidin and cholesterol.

Composition of Eggs

In spite of considerable progress as to methods of determining nutrients in foods, the literature includes data on food composition which may be influenced by uncertain methodology. In the case of the egg, it is also well known that the feed of the hen alters to a great extent the concentration of certain dietary factors but influences others very little.

In the preparation of the present review, considerable time has therefore been devoted to a careful study of the literature in an effort to select values which are believed to represent the most likly composition of hen eggs, as well as data to illustrate the wide range of nutrient concentration which may occur when feeding conditions differ from usual farm practices.

MOST LIKELY COMPOSITION OF EGGS

The most widely used single American reference dealing with the composition of hen eggs is Agricultural Handbook No. 8, *Composition of Foods* (2). The derivation of figures appearing in this source book is explained on page 2 of the publication. Water, energy, protein, fat, carbohydrate, fiber, ash, calcium, phosphorus, iron, and five vitamins (vitamin A, thiamine, riboflavin, niacin, and ascorbic acid) are reported. Data given in Handbook No. 8 include values for raw egg white, yolk and whole egg, hard cooked egg, dried egg white, dried yolk, and dried whole egg. Concentrations of nutrients have been selected after careful study of existing analyses. The values are believed to represent the likely composition of hen eggs.

Since information is frequently sought about factors other than those published in Handbook No. 8, a more inclusive table (Table 1) has been compiled for the present review. These figures should also be considered as likely concentrations. In all cases the source of information is given.

VARIATIONS OF NUTRIENTS DUE PRIMARILY TO FEED DIFFERENCES

Because it is often useful to know to what extent feeding practices, breed, and other factors may influence the composition of eggs, Table 2 has been compiled to centralize such information. In some instances, birds have received deficient rations, in others large excesses of dietary factors have been fed. It is apparent from Table 2 that considerably more research is needed before nutrient variation in eggs is fully appreciated.

Effect of Storage on Nutrients

A voluminous and somewhat conflicting literature exists concerning the retention of nutrient activity in eggs subjected to storage and various types of processing or cooking. As will be revealed from the discussion to follow, nutrient losses in eggs agree generally with losses encountered for many other common foods for a given process and constituent.

PROTEINS AND AMINO ACIDS

The weight of evidence appears to indicate no loss of protein from eggs during storage. This is true for both storage at room temperatures and in the frozen state. Legaspi (3) stated that eggs stored under room conditions for sixty-three days contained practically the same weight of protein as fresh eggs. Results reported by Mitchell (4) indicate that changes in solids, total nitrogen, fat, chlorides, and phosphates occurring in eggs during storage are chiefly due to the transfer of water from the white to the yolk and the loss of water by evaporation through the shell.

Reder (5) verified these reports by analyses of eggs from six groups of White Leghorn pullets placed on diets of increasing protein content and of varied composition and constituents. Determinations were made of total solids, lipoid, fat by acid hydrolysis, total and lipoid phosphorus, total nitro-

TABLE 1 Composition of hen eggs, per 100 gm.

NUTRIENT	WHOLE RAW EGG		RAW EGG WHITE		RAW EGG YOLK	
Proximate Composition						
Water (%)	74.0	(2)*	87.8	(2)	49.4	(2)
Calories	162	(2)	50	(2)	361	(2)
Protein (gm.)	12.8	(2)	10.8	(2)	16.3	(2)
Fat (gm.)	11.5	(2)	0	(2)	31.9	(2)
Carbohydrate						
Total (gm.)	0.7	(2)	0.8	(2)	0.7	(2)
Fiber (gm.)	0		0		0	(2)
Minerals						
Calcium (mg.)	54	(2)	6	(2)	147	(2)
Phosphorus (mg.)	210	(2)	17	(2)	586	(2)
Iron (mg.)	2.1	(69)	0.3	(69)	5.6	(69)
Iodine (mcg.)	12.0	(70)	6.8	(70)	16.0	(70)
Sodium (mg.)	111	(70)	175	(70)	78	(70)
Potassium (mg.)	149	(70)	149	(70)	110	(70)
Chloride (mg.)	100	(70)	131	(70)	67	(70)
Magnesium (mg.)	9	(70)	11	(70)	13	(70)
Fluorine (mg.)	0.06	(72)	0.02	(72)	0.12	(72)
Copper (mg.)	0.17	(70)	0.04	(70)	0.25	(70)
Sulphur (mg.)	233	(70)	211	(70)	214	(70)
Manganese (mg.)	0.04	(70)	trace	(70)	0.11	(70)
Zinc (mg.)	1.3	(70)	0.01	(70)	3.8	(70)
Acidity (excess acid—cc. N acid)	11.1	(68)	5.2	(68)	25.6	(68)
Ash (gm.)	1.0	(2)	0.6	(2)	1.7	(2)
Vitamins						
Vitamin A (I.U.)	1140	(2)	0	(2)	3210	(2)
Vitamin D (I.U.)	50	(75)	0	(75)	150	(75)
Vitamin E (mg.)	2.0	(76)	0	(76)	6.0	(76)
Vitamin K (mg.)	+	(79)	0	(79)	+	(79)
Ascorbic acid (mg.)	0	(2)	0	(2)	0	(2)
Thiamine (mg.)	0.10	(2)	0	(2)	0.27	(2)
Riboflavin (mg.)	0.29	(2)	0.26	(2)	0.35	(2)
Niacin (mg.)	0.10	(2)	—	(2)	trace	(2)
Pantothenic acid (mg.)	2.7	(70)	0.13	(70)	6.0	(70)
Folic acid (mcg.)	9.4	(39)	1.6	(39)	23.2	(39)
Biotin (mcg.)	22.5	(40)	7	(40)	52	(40)
Pyridoxine (mg.)	0.252	(37)	0.217	(37)	0.308	(37)
Choline chloride (gm.)	0.532	(41)	trace	(41)	1.49	(41)
Vitamin B_{12} (mcg.)	0.282	(77)	0.009	(77)	0.826	(77)
Inositol (mg.)	33	(78)	—		—	
Lipides and Their Hydrolysis Products						
Total saturated fatty acids (gm.)	3.04	(111)	0		8.00	(111)
Total unsaturated fatty acids (gm.)	6.63	(111)	0		17.44	(111)
Linoleic acid (gm.)	2.20	(111)	0		5.79	(111)
Linolenic acid (gm.)	0.30	(111)	0		0.78	(111)
Arachidonic acid (gm.)	0.24	(111)	0		0.63	(111)
Cholesterol (gm.)	0.76	(71)	0		2.00	(71)
Amino Acids						
Arginine (% protein)	6.7	(13)	6.3	(13)	7.2	(13)
Aspartic acid (% protein)	5.8	(12)	6.0	(12)	5.5	(12)
Cystine (% protein)	2.2	(13)	2.5	(13)	1.7	(13)
Glutamic acid (% protein)	12.3	(12)	12.4	(12)	12.1	(12)
Glycine (% protein)	3.7	(12)	4.0	(12)	3.5	(12)
Histidine (% protein)	2.7	(13)	2.7	(13)	2.9	(13)
Isoleucine (% protein)	7.0	(12)	7.2	(12)	6.9	(12)
Leucine (% protein)	8.5	(12)	8.5	(12)	8.5	(12)
Lysine (% protein)	6.8	(13)	6.6	(13)	7.2	(13)
Methionine (% protein)	3.3	(13)	4.1	(13)	2.4	(13)
Phenylalanine (% protein)	5.4	(13)	6.1	(13)	4.6	(13)
Serine (% protein)	7.7	(12)	6.9	(12)	8.9	(12)
Threonine (% protein)	5.5	(12)	5.2	(12)	6.1	(12)
Tryptophan (% protein)	1.9	(13)	2.0	(13)	1.8	(13)
Tyrosine (% protein)	4.6	(13)	4.6	(13)	4.6	(13)
Valine (% protein)	8.2	(12)	8.8	(12)	7.3	(12)

*Numbers in parentheses indicate source of data in bibliography.

TABLE 2 Variation in the composition of hen eggs due to feed, breed, and other factors

NUTRIENT	VARIATION
Proximate Composition	
Water	little or no variation
Calories	little or no variation
Protein	little or no variation (4, 5, 81)
Fat	little or no variation (4, 5, 81, 87)
Carbohydrate	little or no variation
Minerals	
Calcium	little or no variation (82)
Phosphorus	little or no variation (4, 5, 81)
Iron	little or no variation (83);
Iodine	*marked influence of diet* (84—86) feeding 2–5 mg. iodine daily from several sources increased the iodine in eggs 75–100 times (84); concentrations of iodine equal to 2500 mcg. iodine per egg observed following high-iodine intake (85); iodine content of eggs ranged from 3 to 1730 mcg. per egg with varying sources and amounts (86).
Sodium	little or no variation
Potassium	little or no variation
Chloride	little or no variation (4)
Magnesium	little or no variation
Fluorine	*positive influence of diet* (72). Inclusion of rock phosphate containing 0.105% fluorine raised the fluorine content of the yolk approximately threefold.
Copper	little or no variation (88, 89)
Sulphur	little or no variation
Manganese	*positive influence of diet* (80). Hens on low manganese rations produced eggs containing 0.045 mg. manganese per 100 gm. dried yolk. When rations contained 100 p.p.m. manganese, concentration rose to 0.342 mg./100 gm.
Zinc	no information found
Acidity	little or no variation
Ash	little or no variation
Vitamins	
Vitamin A	*positive influence of diet* (91–94) (91) Hens maintained on a given ration produced eggs differing widely in carotene and vitamin A concentration. Also, there is a direct relationship between intake and level in eggs. (92) Low egg producers generally lay eggs of higher vitamin A potency than high producers. (93) Vitamin A content of the yolk increases with increased vitamin intake of the hen. (94) Hens deficient in carotene or vitamin A produce eggs with as little as 58 I.U. per yolk.
Vitamin D	*positive influence of diet* (93, 95) (93) Vitamin D content of eggs influenced by the amount present in the ration. (95) Hens receiving massive doses of irradiated ergosterol produced eggs with as much as 48,000 I.U. vitamin D per yolk.

Table 2 (Continued)

NUTRIENT	VARIATION
Vitamins (continued)	
Vitamin E	*positive influence of diet* (96, 97) (96) Eggs produced on normal diets contained three times the vitamin E potency of those of vitamin E-deficient birds. (97) Prolonged restriction of tocopherols produced eggs of 0.16–0.64 mg. alpha tocopherol per 100 gm. whole egg as compared with 2.5–4 mg. per 100 gm. when birds were supplemented with moderate intakes. Tocopherol concentration of eggs varied linearly with the log-dose. Concentrations as high as 30 mg. and above per 100 gm. whole egg were encountered.
Vitamin K	*positive influence of diet* (79). Data limited.
Ascorbic acid	no variation with diet
Thiamine	*positive influence of diet* (98). Supplements high in thiamine increased thiamine content of the egg yolk.
Riboflavin	*positive influence of diet* (99, 100) (99) Riboflavin-low diets fed to hens resulted in eggs of low hatchability and riboflavin potency with as little as 75 mcg. per whole fresh egg. (100) Maximum riboflavin values for egg white and yolk reported when the rations contained 800 to 1000 mcg. riboflavin per 100 gm. diet.
Niacin	no information found
Pantothenic acid	*positive influence of diet* (101–103) (101) Relationship between intake and egg vitamin potency established. (102) Range of pantothenic acid concentration from 2–20 mcg. per gram whole egg, depending on vitamin level of diet. (103) Range of 7–50 mcg. pantothenic acid observed.
Folic acid	*positive influence of diet* (104, 105) (104) Direct relationship between folic acid content of ration and that of egg. (105) Deficient rations result in eggs with one-tenth the folic acid concentration of heavily supplemented hen's eggs. Hatchability of eggs unsatisfactory.
Biotin	*positive influence of diet* (106, 107) (106) Penicillin administration caused increase in biotin in eggs. (107) Various carbohydrates apparently influenced intestinal synthesis resulting in different amounts of biotin in eggs.
Pyridoxine	no information found
Choline chloride	little or no variation (108). Synthesis of choline in substantial amounts even under imposed conditions of low choline and methionine intakes.

Table 2 (concluded)

NUTRIENT	VARIATION
Vitamins (concluded)	
Vitamin B_{12}	*positive influence of diet* (77, 109, 110). (77) Individual hens show unexplainable difference in B_{12} content of eggs. Relationship of intake to egg concentration established. (109) Marked response to B_{12} content of egg yolk following injection of high levels of vitamin. (110) Injection vs. oral feeding caused rapid and greater deposition of B_{12} in the egg.
Inositol	no information found
Lipides and Their Hydrolysis Products	
Stearic acid	little variation (73, 87)
Palmitic acid	little variation (73, 87)
Oleic acid	*positive influence of diet* (87). Changes in concentration of the highly unsaturated fatty acid intake of the hen influenced balance of total fat of the egg mainly through altering oleic acid fraction.
Linoleic acid	*marked change due to diet* (73, 87). Egg fatty acids of hens on fat-free ration reduced to 1.79% for linoleic acid.
Linolenic acid	*positive influence of diet* (73, 87). Fat-free diet resulted in eggs in which only 0.30% of the fatty acids was in the form of linolenic acid.
Arachidonic acid	no information found (74)
Cholesterol	little or no variation (87)
Amino Acids	
Cystine	little or no variation (90)
Lysine	little or no variation (90)
Methionine	generally believed to vary little
Tyrosine	little or no variation (90)
Tryptophan	little or no variation (83)
Other amino acids listed in Table 1	no information found

gen, water-soluble nitrogen, and albumen nitrogen of fresh eggs and after periods of storage at 31° to 38°F. from 9 to 236 days. Results of these analyses calculated on a dry weight basis revealed no appreciable changes in the lipoid, fat, phosphorus, and nitrogen content of eggs due to storage. Apparent changes in composition were due to variation in moisture contents. The moisture of the yolk increased and that of the white decreased during storage. Diet likewise had no effect on composition of the constituents analyzed but did affect the moisture loss during storage. The loss in total egg weight during storage was greatest in eggs produced by pullets on a high-protein diet (25 per cent protein).

Weight loss from egg albumen during storage accompanied by an increased concentration of protein in the albumen has been reported by Jenkins *et al.* (6); Romanoff (7); and Silva (8). A small decreased protein content of egg yolks during storage was reported by Jenkins *et al.* (6); Silva (8); and Evans, Davidson, and Butts (9). However, Szörenyi (10) found no change in yolk protein during storage.

The influence of low temperature storage was retested in 1953 by Evans and Davidson (11), at which time eggs from White Leghorn hens fed diets of constant composition were stored for nine and eighteen months at 0°C. No loss of protein occurred during the maximum time tested.

Dried eggs likewise show no loss of protein as compared with fresh eggs. McNall (14) analyzed the total nitrogen of authentic samples of dried whites, yolks, and whole eggs, together with samples of the liquid eggs from which the dried eggs were made. No difference in results calculated on a dry basis was found. Water-soluble nitrogen and crude albumen nitrogen were determined on the fresh eggs by McNall, and results from six collaborators were obtained on the dried whole eggs and yolks and a sample of egg albumen. The collaborative results on dried whole eggs and egg yolks which were in fairly close agreement showed no loss in water-soluble nitrogen and crude albumen in the spray-dried whole eggs. Insignificant loss in these fractions was found in the spray-dried yolks.

Schörmuller and Walter (15) found no loss in threonine and serine content of the protein of whole egg in a comparison of fresh and commercially dried egg powders. Prolonged storage at room temperature had no effect on these oxyamino acids, but an increase in atmospheric humidity caused a slight reduction in the concentration of both threonine and serine.

MINERAL ELEMENTS

Variation in mineral content of eggs due to processing or storage conditions has been explored to a limited extent. These elements have received little attention due to their stability.

Erikson and co-workers (16) reported that the calcium content of the yolk was higher in eggs after twelve months' cold storage than in fresh eggs. Since the loss of water that occurs during storage probably does not entirely account for the differences, they concluded that there may be a slight transfer of calcium from the shell to the yolk. However, Kiermeier *et al.* (17) found a decrease in calcium in both the white and yolks at the end of five months' storage in lime water.

The Kentucky group (18) found a minor decrease in the total phosphorus of egg yolks from storage eggs and an increase in the total acid-soluble phosphorus. The ratio of total acid-soluble phosphorus was greater in storage than in fresh egg yolks. After four to eight months' storage in Garantol,

lime water, and water glass, the phosphate content of white and yolk was increased, according to the reports of German investigators (17). Mitchell (4) and Reder (5), however, found no appreciable change in the total and lipoid phosphorus of eggs as a result of cold storage. Apparent changes in composition were due to variations in moisture contents, which appear to be largely responsible for differences reported between laboratories.

Long storage may result in the development of pink white in eggs. Schaible, Bandemer, and Davidson (19) found that eggs from hens fed non-cottonseed rations developed pink white and enlarged yolks after twenty to forty-two months' cold storage. Eggs from hens fed cottonseed oil rations developed pink whites and enlarged salmon-colored yolks after four months' cold storage. These discolored eggs showed an increase in the concentration of iron in the whites and a decrease in the yolk during storage (20). The salmon color of the yolk of cottonseed oil eggs may be attributed to the diffusion of the conalbumin fraction of egg white into the yolk and its combination with iron (21). Discoloration of egg whites during storage is attributed to diffusion of iron through the vitelline membrane. Addition of iron in a concentration similar to that found in egg yolk was found to produce a pink color in fresh egg white.

VITAMINS

Vitamin A

Vitamin A and carotenoids are not affected by dehydration of eggs, but may be lost during subsequent storage of the dried eggs. Since vitamin A is readily oxided, low temperature and protection from contact with air are the best methods of storage of dried products. Freezing and holding of shell eggs at room temperature bring about no change in vitamin A activity.

Hauge and Zscheile (22) reported little or no loss of vitamin A and carotenoids during dehydration of fresh liquid eggs by a Majonnier spray drying process. Storage of both liquid and dried eggs at a temperature of —18°C. for fourteen weeks did not result in measurable losses of carotenoids and vitamin A. This work was confirmed in a later report of Hauge *et al.* (23) in which they found extended storage of dried eggs at a temperature of —18°C. for twelve months still resulted in negligible losses of vitamin A potency. At 5°C., losses were small. At 20°C., room temperature, and warehouse temperature, appreciable losses were noted after three months, but the rate of loss was greatly reduced during the next nine months.

Klose, Jones, and Fevold (24) likewise found no significant destruction of vitamins in the egg by spray-drying of emulsified whole eggs. During storage of the dried egg for nine months, vitamin A was unstable, 60 per cent being lost at a temperature of 15°F. (—9.44°C.), 75 per cent at 70°F. (21.11°C.), and 80 per cent at 98.6°F. (37°C.). Similar losses of vitamin A during storage of dried eggs were found by Whitford *et al.* (25). Based on the amount of vitamin A present in freshly dehydrated egg (66 I.U. per gram), the losses after twelve months' storage were 47 per cent at 35 to 40°F., 70 per cent at 70°F., and 89 per cent at 100 to 105°F.

Packaging dried eggs in sealed tin cans improved the vitamin A retention (Bohren and Hauge [26]). Eggs sealed in tin cans retained 75 per cent of their vitamin A potency, regardless of storage temperature. Storage either loose or compressed in waxed fiber cartons for six months at 20°C. resulted in only 62 per cent retention of initial vitamin A. At 37°C., they retained only 30 per cent. Compressing the dried egg powder prior to packaging failed to have any beneficial effect on vitamin A retention. Egg powders stored in a nitrogen gas pack at 15°C. for five months by Cruickshank, Kodicek, and Wang (27) showed no appreciable loss of vitamin A.

Vitamin D

Egg yolks are a good source of vitamin D, which seems to be little affected by cold storage, drying, storage of egg powders, and cooking. Tso (28) found little or no change in the antirachitic factor in "pidan," Chinese eggs preserved by applying a mixture of slaked lime, straw ash, soda, salt, and water. Woods and Clow (29) found no appreciable loss in vitamin D in shell eggs stored in water glass for six to nine months. Clow and Marlatt (30) found that cooking eggs, even to the extent of "hard boiling," did not impair their antirachitic properties. Storage for six months in an electric refrigerator (40°F.) and after dipping in hot fat (375°F.) for 5 seconds, and dipping in hot water (205°F.) for 5 seconds did not result in loss of antirachitic potency. The "dipped" eggs were placed in a regular egg box and kept in the fruit and vegetable room in the basement of a frame residence. The latter method of storage for as long as six months resulted in a change in the physical consistency of such eggs so that it was impossible to separate the yolk from the white.

Kentucky experiment station workers (31) suggested that yolks of eggs produced in the spring and stored until fall or winter had a higher content of vitamin D than that of yolks of eggs produced in the fall and winter under like conditions. But Branion, Drake, and Tisdall (32) found the vitamin D content of market eggs varied only slightly throughout the year. There was little or no loss of this vitamin in eggs kept in cold storage for ten months. Lesné and Clément (33) found that yolks of eggs preserved in limewater or water glass for eight months possessed appreciable antirachitic properties.

Commercial egg powder made by drying whole eggs protected rats against rickets when fed at a 2 per cent level in the diet (33). Klose *et al.* (24) and Cruickshank *et al.* (27) found that spray-drying of whole eggs had no significant destructive action on the vitamin D, nor was there appreciable loss of this vitamin during subsequent storage of the egg powder even at a temperature as high as 98.6°F. for nine months. More recently Antoniani, Federico, and Missiroli (34) found no appreciable variation in the vitamin D_2 in eggs preserved by lime, by cold storage at a temperature of 0°C. and 80 per cent relative humidity, and by preservation in an artificial atmosphere of 95 per cent nitrogen and 5 per cent carbon dioxide, and at a temperature of 1°C. The loss of vitamin E was about 50 per cent in all three methods of preservation.

B Vitamins

Eggs are an important source of several of the B vitamins. The stability of some of these after storage, drying, and cooking has been reported by several investigators.

Antoniani, Federico, and Missiroli (34) studied the changes in thiamine and riboflavin content in eggs preserved by means of lime, by cold storage at a temperature of 0°C. and 80 per cent relative humidity, and by the so-called stabilization method, i.e., preservation in an artificial atmosphere of 95 per cent nitrogen and 5 per cent carbon dioxide under pressure and at a temperature of 1°C. With lime, the thiamine remained practically unaltered, but riboflavin was lowered by 20 per cent. Cold storage slightly lowered the quantities of both thiamine and riboflavin. The stabilization method slightly reduced the amount of thiamine, but did not affect the riboflavin content.

Evans and co-workers have reported the changes in B vitamins during storage of shell eggs in a series of papers. The riboflavin (35) content of fresh eggs was found to average 169.7 mcg. per egg, 59 per cent of which is in the white and 41 per cent in the yolk. During storage for six months at 0°C., 14.1 per cent of the total riboflavin was lost. No further loss of this vitamin occurred during the next six months of storage, but there was a transference of riboflavin from the yolk to the white.

Niacin (36) loss after seven months' storage was approximately 17 per cent. Fresh eggs contained 31.3 mcg. per egg.

The average vitamin B_6 (37) contribution per fresh egg was 123.6 mcg. A rapid loss of this vitamin occurred during cold storage. About half was lost after twelve months' cold storage, losses occurring to about the same extent from albumen and yolk.

Fresh eggs contained an average of 608 mcg. pantothenic acid (38) per egg, the highest concentration being in the yolk. Approximately 8 per cent was lost during twelve months of cold storage. There was also a transfer of pantothenic acid from the yolk to the albumen.

Folic acid (39) in fresh eggs averaged 4.59 mcg. per egg, almost nine-tenths of which was in the yolk. No loss occurred during the first three months of cold storage, although there was a transfer of folic acid from yolk to white. At the end of six months' storage, the loss was 16 per cent and at the end of twelve months, 27 per cent, chiefly from the egg yolk.

No losses of biotin (40) or choline (41) were observed during storage. Fresh shell eggs contained an average of 10.76 mcg. of biotin per egg. No transfer between yolk and white occurred during storage. But choline, which averaged 251.4 mg. per egg, showed some transfer from yolk to albumen during cold storage. Practically all the choline of fresh eggs was concentrated in the yolk.

Effect of Drying

Klose, Jones, and Fevold (24) found no destruction of thiamine during spray-drying of emulsified whole egg. This was later confirmed by Whitford *et al.* (25). In contrast to these reports, Cruickshank *et al.* (27) reported a 30 per cent loss of thiamine on drying. Apparently the loss of this vitamin depends on the drying conditions.

No loss of riboflavin was found by any of the investigators (25, 27), nor was there loss of niacin during dehydration (25).

The stability of thiamine during storage of dried egg powders depends on the storage temperature and moisture content. At 15°F., Klose *et al.* (24) found thiamine to be stable. At 70°F. there was 46 per cent loss; at 98.6°F. there was 50 per cent loss. Olsen, Weybrew, and Conrad (42) presented evidence to show that destruction of thiamine in dehydrated eggs varies inversely with the moisture content of the sample. Loss of thiamine in the samples stored at 98.6°F. for fifty-seven weeks was 70 per cent when it contained 3.53 per cent moisture; and 41 per cent when it contained 1.66 per cent moisture. They found thiamine retentions as high as 93 per cent after fifteen weeks' storage at 98.6°F. when the liquid egg was acidified to a *p*H of 4.2 before drying to a moisture content of 3.3 per cent.

Cruickshank *et al.* (27) stored egg powders with a relatively high water content, viz., 8.4 per cent and 11.0 per cent. After nine months' storage at 37°C. in air, practically all the thiamine was lost. Correspondingg samples stored at —20°C. for nine months had a thiamine content similar to that of the average of all egg powders examined. Thiamine also remained stable in egg powders stored in a nitrogen gas pack at 15°C. for twelve months. They concluded that it was the high storage temperatures rather than moisture content which detrimentally

affects the retention of thiamine. Whitford *et al.* (25) also found increased destruction of thiamine in egg powders stored at higher temperatures. After twelve months' storage of egg powders containing 2 per cent moisture at 35° to 40°F., the thiamine loss was 11 per cent; at 70°F., 30 per cent; and at 100 to 105°F., 57 per cent.

Riboflavin in egg powders appears to be stable under all conditions of temperature and moisture content during storage (25, 27). Likewise, niacin is not lost from egg powders during storage (24, 25). Experimental evidence of the degree of stability of other B vitamins during dehydration and storage of egg powders has not been reported in the literature covered by this review.

Cooking Losses

Lane, Johnson, and Williams (43) reported a thiamine loss of 29 per cent in boiled eggs and 9 per cent in scrambled eggs. The original thiamine content of these eggs was 1.12 and 1.03 mcg. per gram, respectively. Stamberg and Petersen (44), in analyses of thirty-two raw and thirty-two prepared eggs, showed an average loss of 15.0 per cent of the thiamine due to cooking. The loss was quite uniform with all methods of preparation. Boiled eggs lost 13.3 per cent, fried eggs 13.3 per cent, poached 18.3 per cent, and scrambled 14.2 per cent. Raw eggs contained an average of 1.20 mcg. thiamine per gram, while the average thiamine in all prepared eggs was 1.02 mcg. per gram.

The loss of riboflavin in cooking may be influenced by the amount of light, since it is well known that light has a destructive action on riboflavin. In two tests on scrambled eggs cooked in an open pan, Cheldelin, Woods, and Williams (45) found 48 per cent and 22 per cent loss of this vitamin. In the first case, 8 gm. fat were used, and in the second, 1 gm. Scrambled eggs in a covered pan with no fat added resulted in no loss of riboflavin. There was also no loss in baked eggs. In another study of the cooking losses of riboflavin in egg (44), the average loss by all methods was 7.7 per cent. Poached eggs showed appreciably higher loss of riboflavin than boiled, fried, or scrambled eggs. The average loss of riboflavin for each of the cooking methods was as follows: boiled, 5.1 per cent; fried, 7.5 per cent; poached, 16.5 per cent; and scrambled, 1.5 per cent. Scrambled eggs were prepared in an open pan with 15 ml. distilled water added. Poaching was done in tap water. All cooking was done in daylight in a well lighted room.

Losses of folic acid in cooking has been reported to be greater than for any other B vitamin. Cheldelin *et al.* (45), in one sample of baked eggs, showed a loss of 65 per cent, and one sample of scrambled eggs, a loss of 31 per cent from the original value of 110 mcg. per 100 gm. Hanning and Mitts (46) found the average folic acid concentration of raw eggs to be 180 mcg. per 100 gm. Cooking losses in poached, scrambled, and fried eggs ranged from 20 to 50 per cent of that present in the raw egg. There was no indication that one method of preparation was preferable. Losses of 60 to 70 per cent were obtained for meringues and angel food cakes. Heating appeared to be the major factor in the loss of folic acid during cooking.

A loss of 25 per cent of the niacin was reported in one sample of baked eggs. No loss of pantothenic acid or biotin resulted in baked eggs, and no loss of inositol was found in scrambled eggs (Cheldelin *et al.* [45]). Reports on cooking losses of other B vitamins in eggs could not be found.

Physiologic Availability of Nutrients in Eggs

Of importance beyond knowledge of the nutrient make-up of any food is evidence of the extent to which factors present are used by human or animal subjects. Information on this general topic is limited. However, sufficient foods and nutrients have now been tested to make it clear that foods differ widely with respect to the availability of the nutrients present. Studies completed thus far suggest that the nutrients present in eggs are available and well utilized.

The classic work of Atwater and Bryant (47) concerned with the availability of proteins and fats of eggs revealed that approximately 97 per cent of the proteins and 95 per cent of the total fat were absorbed by healthy human subjects. Of many items tested, no other food was found to be superior in these respects. Recent research dealing with the utilization of amino acids indicates that the amino acids of eggs are readily available to the consumer. Guthneck, Bennett, and Schweigert (48) observed that 98 per cent of the lysine of dried whole egg was utilized to support weight gain in protein-depleted rats. These new findings might have been expected from studies of Murlin and his associates (49) demonstrating the excellent performance of animals receiving egg proteins.

In the case of iron, Shackleton and McCance (50) have found the total iron of egg to be in the ionizable form; thus, according to Elvehjem, Hart, and Sherman (51), it is completely available for hemoglobin formation.

Phosphorus of egg is also believed to be readily available. Phytic phosphorus widely distributed among plant foods and known to be less well used than other forms is absent from egg.

While many other nutrients must be tested before general conclusions should be drawn regarding the physiologic availability of the essential nutrients furnished by eggs, a high degree of utilization of these factors is expected.

The literature includes reports of several experiments testing raw egg albumen which introduce

some doubt as to the efficient utilization of nutrients found in unheated egg white. Hosoi, Alvarez, and Mann (52) found that dogs having a fistula of the terminal ileum exhibited considerably larger fecal residues when raw egg albumen was consumed than when either soft boiled or hard boiled eggs were eaten. Dried egg albumen was observed to behave in much the same manner as the liquid white. No satisfactory explanation has been given for the differences observed, nor has the problem been explored adequately in human subjects. Furthermore, little information is known except that the residue is increased when raw vs. cooked albumen is consumed. While these observations need additional study, especially to determine their significance as they are related to hospital or special feeding needs, it appears that the nutrients of eggs are well utilized when customary methods of cookery are used.

Nutritional Significance of Avidin in Egg White

Feeding experiments conducted by Boas (53) and Parsons and her associates (54) demonstrated that high levels of unheated egg white produced a detrimental effect on test animals. Following numerous studies of the "toxic" effect of a substance occurring in egg white, Parsons and Kelly (55) concluded that the active material was proteinous in nature. The harmful effect disappeared when egg white was heated.

A crystalline material isolated from egg white and capable of producing lesions similar to those described by Boas and Parsons was announced by Pennington, Snell, and Eakin in 1942 (56). This substance, named avidin, was proved to combine with a vitamin (biotin), rendering the essential factor unavailable to test animals. Raw egg white was, therefore, found to contain a physiologically active substance which combines with biotin to form a complex which the host cannot absorb.

Recent work by Fraenkel-Conrat, Snell, and Ducay (57) has revealed that avidin makes up 0.05 per cent of the total proteins of egg white. Three biotin-binding fractions are present. Two molecules of biotin are bound by each molecule of avidin.

The embryologic significance of avidin is not understood at this time, and information regarding its purpose is awaited with interest. From the standpoint of avidin combining with biotin to cause a vitamin deficiency in human subjects, this problem appears not to be of wide-spread nutritional importance. The distribution of biotin among common foods, including egg yolk, and the ease with which avidin is rendered inactive makes it unlikely that ordinary uses of underheated egg white have an unfavorable effect on the consumer by producing a shortage of biotin.

An exception to this conclusion may exist in special hospital or emergency feeding where limited food intake resulting in a low biotin intake is accompanied by the frequent use of unheated egg white. In such circumstances, the practice of including biotin in the diet in its pure form or as a concentrate may be desirable. Judgment about the need for added biotin will depend on the continued use of such a regimen and the dietary history of the individual.

Dietary Cholesterol and Serum Cholesterol

The concentration of cholesterol in the yolk of eggs is high enough to raise the question of whether the consumption of eggs leads to increased serum cholesterol levels, thus increasing the tendency for atherosclerosis to develop. For many years all sources of dietary cholesterol have been looked on with disfavor for subjects having high serum cholesterol values, in spite of the knowledge that cholesterol is constantly being formed in the body in the absence of an exogenous dietary supply of this compound.

The relationships of dietary cholesterol, serum cholesterol concentration, and atherosclerosis have recently been reviewed (58). Keys and his associates (59) have explored a series of questions relating to this general problem, including: the customary cholesterol intake of men of various ages; the serum cholesterol level of men in different age brackets; the relationship between dietary cholesterol and serum cholesterol levels; the influence of raising or lowering the dietary cholesterol intake on blood cholesterol; and the effect of other dietary constituents on the level of serum cholesterol in human subjects.

Several investigators have determined the effect of administering cholesterol to the chick or the rabbit (60, 61). Huge doses of cholesterol have also been given to human subjects by Messinger *et al.* (62) and Kinsell *et al.* (63). Okey and Stewart (64) observed a small increase in serum cholesterol concentration in human subjects following the consumption of two egg yolks daily. However, in the latter investigation, the additional fat of the egg yolks was not adjusted during the control diet periods (59).

The extensive literature concerned with this important health problem indicates that, in the case of man, serum cholesterol values cannot be explained by knowledge of the cholesterol intake. The level and type of fat appear to be important considerations (65, 66) with evidence suggesting that saturated fatty acids may have a detrimental effect while unsaturated fatty acids do not. In addition, normal thyroid function is suggested as counteracting any adverse effect of high fat feeding, according to Barnes and Barnes (67). These experiments make clear that the relationship of diet to atherosclerosis is only partially understood at this time.

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Hospital Admissions

In 1956, admissions to hospitals of all types were 22,089,719 tor 132 per thousand population, according to the American Hospital Association. The rate ten years before was 112 per thousand. The 6,966 hospitals in the continental U.S. in 1956 had 1,607,692 beds with an average daily census of 1,355,792.

Length-of-stay in short-term general and special hospitals dropped from 9.1 days in 1946 to 7.7 days in 1956. During the same period, the cost to the hospital per patient stay rose from $88.35 to $187.43.

A Weight-Reducing Experiment[1]

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Nutrition education and simple modifications of the regular residence hall menu prove feasible for reducing or maintaining weight in a group of college freshmen women.

BIOCHEMICAL EVIDENCE of metabolic changes caused by restricted caloric intake has been noted by various research workers. Keys (1) found a temporary rise in the serum cholesterol when a moderate reducing diet was fed. In another paper, Keys reports (2) that when an individual subjected himself to alternate periods of overeating and undereating, the serum cholesterol rose to 31 per cent over what it was during the pre-dieting regimen. Young (3) found a depression in the basal metabolic rate during moderate reducing diets of approximately 1400 calories per day. Ohlson *et al.* in Michigan also reported (4) a decreased basal metabolic rate in women on various reducing diets.

The lowering of the basal metabolic rate is frequently accompanied by a feeling of fatigue on the part of the dieter. This is not a desirable condition for a busy college woman who is trying to keep up with the academic requirements as well as the extra curricular activities which are so much a part of campus life.

This experiment was conducted to test the effectiveness of weight loss and weight control by the application of the general principles of good nutrition rather than the adherence to strict dietary pattern and to test the changes, if any, in the serum cholesterol level and the basal metabolic rate during the experimental period.

Procedure

During the 1956-57 academic year at Montana State College, an experiment was conducted to test the effectiveness of a weight reducing program for obese young women, that could be adapted to residence hall living and, it was hoped, would not impose undue hardship on the individual.

Members of the group were freshmen girls who were 10 per cent or more over "ideal" weight as determined by Justin, Rust, and Vail's adaptation (5) of the "Height, Weight, and Body Build Chart for Women" of Baldwin and co-workers. So that there might be a degree of uniformity in the living conditions among the members of the group, final acceptance of volunteers was limited to freshmen women who were to room and board in one residence hall on the college campus.

There is evidence that the level of knowledge of good nutrition in the general populace leaves much to be desired. Simmons, in his report on the Herrick Memorial Hospital research with approximately 450 obese men and women, states (6) that in spite of the patients' long concern with weight control and their statements that they knew all about good diets, most were completely ignorant of good dietary practices. Jolliffe (7) believes that the reason many dieters are unsuccessful in losing weight is that they have never learned the "whys" of dieting and have never developed proper eating habits so that they could maintain "ideal" weight once they achieve it.

To help the members of our group lose weight, a class in nutrition education for weight reduction was organized as part of the experiment. This phase of the experiment seemed particularly necessary since six of the ten girls stated that they had had no previous nutrition education of any kind; three reported "some" in high school; and only one reported "a little" nutrition instruction from her doctor. The teaching techniques used for this class, which met once a week for ten weeks, have been reported elsewhere (8). Dietary modifications and good nutrition, rather than the "counting of calories," were emphasized in the nutrition class. The girls did not eat at a diet training table but used the nutritional information learned in class to adapt the regular residence hall menu to their specific

[1]Received for publication June 6, 1957.

TABLE 1 **Initial weights of subjects and weight changes during experiment**

SUBJECT	WEIGHT IN SEPTEMBER	EXCESS OVER "IDEAL" WEIGHT	WEIGHT CHANGE SEPTEMBER TO DECEMBER (t=4.43*)	WEIGHT CHANGE DECEMBER TO MARCH (t=0.03†)	WEIGHT CHANGE SEPTEMBER TO MARCH (t=2.20‡)
	lb.	*lb.*	*lb.*	*lb.*	*lb.*
S.A.	193	41	− 3	4	1
M.E.B.	161	26	− 6.5	3.5	− 3
M.H.	180	54	− 5	− 3	− 8
I.H.	152	14	− 3	2	− 1
T.J.	170	52	−16	−13	−29
W.K.	183	33	−10	0	−10
B.P.	150	24	− 5	4	− 1
J.T.	194	33	− 1	3	2
D.R.	160	37	− 3	− 1	− 4
K.W.	149	19	−10	0	−10
Average weight change per person			− 6.25		− 6.3

*Significant at 1 per cent level.
†Not significant.
‡Nearly significant at 5 per cent level.

needs. The modifications in the regular residence hall diet consisted mainly of eating lightly of starchy and fatty foods served, taking second helpings of salads or vegetables when allowed, eating all of the meat or protein foods, and eliminating the rich desserts. "Snacking" and room parties called for moderation and self-discipline.

The girls were weighed once a week from September until March. Blood was drawn for serum cholesterol determinations in September, December, and March. From the serum of each blood sample two aliquots were taken, and each aliquot was analyzed in duplicate. A modification of the method of Abell *et al.* (9) was used for the determination of total serum cholesterol.

The basal metabolic rate for each subject was made the morning after the blood drawing for cholesterol determinations. A Benedict-Roth basal metabolism machine was used, and the lowest value of two successive determinations that were in close agreement was accepted as recommended by Roth (10). The Boothby, Berkson, and Dunn normal standards (11) were used in computing the metabolic rate for the individual.

Results

After the preliminary physical examination and psychologic screening, ten volunteer subjects were accepted for the experiment. They varied from 14 to 54 lb. over their "ideal" weight, and all lived in one residence hall.

WEIGHTS

During the first three-month period, while the girls attended the special nutrition class, there was an average weight loss of 6.25 lb. per person. Weights of 158 other freshmen girls living in the same residence hall and served the same menu showed an average gain of 2.3 lb. during the same period. When one considers the weight gain of this latter group, the average weight loss of 6.25 lb. per person for the experimental group becomes more impressive. Under college residence hall living conditions indicated by these results, even weight maintenance would have been an accomplishment for one who is inclined toward obesity.

During the next three months, from December to March, when the group did not attend the nutrition class and were on their own in their efforts to apply the knowledge they had gained regarding dieting for weight loss, there was no significant weight change. However, in Table 1, it is evident that three of the girls continued to lose weight at about the same rate as in the previous period; two maintained their weights; and five gained from 2 to 4 lb.

At the end of the six-month experimental period, there was an average weight loss of 6.3 lb. Eight girls lost from 1 to 29 lb., and two girls gained 1 and 2 lb., respectively.

It may be assumed from these results that the girls needed closer supervision for a longer period of time in order to help them change their pattern of eating. Most of those who lost weight said that it was much easier to stick to the diet during the first three months when they were together in class than it was when they were on their own. All but one (K.W.) said that dieting was definitely *not* easy.

CHOLESTEROL

Sperry has shown (12) that normal values for serum cholesterol derived by averaging results of group experiments are without value when applied

TABLE 2 **Percentage variation from the mean of three serum cholesterol determinations for each girl**

SUBJECT	SERUM CHOLESTEROL				VARIATION FROM MEAN		
	September	December	March	Mean	September	December	March
	mg./100 ml.	*mg./100 ml.*	*mg./100 ml.*	*mg./100 ml.*	%	%	%
S.A.	190.0*	158.9†	173.5*	174.1	9.1	8.7	0.04
M.E.B.	214.5	227.1	239.5	227.0	7.3	0.04	7.2
M.H.	194.0	190.0	209.3	197.8	2.2	4.5	5.8
I.H.	161.9	142.0	141.7	148.5	9.0	4.4	4.6
T.J.	173.9	184.3	180.1	179.4	3.1	2.7	0.4
W.K.	190.0	220.9	226.5	212.5	10.6	3.9	6.6
B.P.	242.8	237.7*	191.6*	224.0	8.4	6.1	14.5
J.T.	163.3	172.9	163.1	166.4	1.9	3.9	2.0
D.R.	228.4	228.3	214.9	223.9	2.0	2.0	4.0
K.W.	196.4	187.9	201.9	195.4	0.5	3.8	3.3

*Taking thyroid extract as prescribed by physician.
†Increase in existing thyroid prescription.

TABLE 3 **Basal metabolic rates for the experimental subjects in September, December, and March**

SUBJECT	BASAL METABOLIC RATE		
	September (beginning of experiment)	December (end of nutrition class)	March (follow-up)
	%	%	%
S.A.*	−23.3*	− 8.2†	−13.6*
M.E.B.	−15.3	−19.7	−22.1
M.H.	−12.8	−18.5	−16.0
I.H.	0.3	−10.3	−10.0
T.J.	0	− 5.9	− 2.0
W.K.	−18.3	−22.5	−14.6
B.P.	−17.4	−19.7*	−13.8*
J.T.	− 7.3	−16.8	− 8.0
D.R.	−10.8	− 5.3	−11.8
K.W.	−16.9	−15.8	−16.9

*Taking thyroid as prescribed by physician.
†Increase in existing thyroid prescription.

to the individual. It would seem that an average of a series of serum cholesterol determinations over a period of time is of more value to the individual in indicating possible metabolic changes at work in his body. For this reason, a mean value for each individual in the experiment was determined from the serum cholesterol values in September, December, and March. In Table 2 the percentage variation from the mean serum cholesterol value for the three determinations is shown for each girl.

With the exception of one subject (B.P.), the percentage variation from the mean of the individual's serum cholesterol level for the three determinations was well within the limits of variation found by Sperry (12) for the healthy members of his experiment. The drop in B.P.'s March serum cholesterol level might have been caused by thyroid medication which her doctor had prescribed late in November. This drop in serum cholesterol level under thyroid therapy has been noted by other researchers (13).

The rather large total increase (36.5 mg. per 100 ml. serum) in the serum cholesterol level of W.K. from September to March (Table 2) could have been an indication that this girl was not always following the advice of moderation in dieting and was subjecting herself to periods of relative fasting interspersed with periods of overeating. Except for the two subjects discussed above, there were no significant changes in serum cholesterol levels, indicating that the dietary regimen was without significant effect on the metabolic pattern reflected in these determinations. A t-test with matched pairs showed no significant difference at the 1 per cent level in any of the series of serum cholesterol determinations.

BASAL METABOLIC RATES

In Table 3 are summarized the basal metabolic rate determinations for each girl in September, December, and March. A t-test with matched pairs indicated no significant difference at the 1 per cent level between any of the tests. The actual numerical values for the basal metabolic rate of each subject show little change during the experiment in spite of the dieting regimen.

However, it is of interest that, with two exceptions (September for I.H. and T.J.), all of the basal metabolic rates are negative; also, over half of the determinations fell well below the −10 per cent generally accepted as the lower limit of normal variation. Either a low basal metabolic rate was associated with obesity in these young women or this is another indication that our present standards for normal basal metabolic rates are too high.

Summary

The feasibility of inducing and maintaining weight control in college freshmen women by the application of the general principles of nutrition rather than an adherence to a restricted diet has been tested over a six-month period. Serum cholesterol and basal metabolic rate determinations were made periodically during the experiment.

The experimental group consisted of ten freshmen who were from 14 to 54 lb. over "ideal" weight. The girls attended a nutrition education class planned especially for them for ten weeks during which time they modified their regular residence hall menu by eating lightly of starchy and fatty foods served, taking second helpings of salads and vegetables when allowed, eating all of the meat or protein foods, and eliminating rich desserts.

Average weight loss over a six-month period was 6.3 lb. per person. All but two members of the experimental group weighed less at the end of the experiment than at the beginning. The two who gained weight, gained 1 and 2 lb., respectively.

A statistical analysis of three serum cholesterol and three basal metabolic rate determinations in September, December, and March indicated that this sort of dietary regimen had no significant influence on these biochemical values for any of the subjects.

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Antioxidants and Serum Lipides

The effect of antioxidants was studied in both rabbits and men. Nine men served as the human subjects, while twelve female rabbits were used for the animal experimentation. The diets were kept constant, in both human and animal subjects. The animals were divided into three groups of four: Group I was fed 0.75 per cent (in peanut oil) in the diet; Group II, a normal rabbit group, received a regular chow diet; and Group III, received 75 per cent cholesterol (in peanut oil) plus tocopherol.

After a control series of bleedings, serum cholesterol and ultracentrifugal analyses of lipoproteins were carried out at bi-weekly intervals. The *d*-alpha-tocopherol was ingested at a level of 500 to 600 mg. per kilogram per day in both man and animals. The butylated hydroxytoluene was given in varying doses—from 450 to 1350 mg. per day. Ascorbic acid was given in combination or singly. The massive doses of tocopherol in the men produced a fall in the S_f 0—10 lipoproteins by as much as 18 per cent, in the cholesterol levels by as much as 30 per cent. No deleterious effects were noted by any of the compounds or combinations. Subjects on alpha-tocopherol on a 500- to 600-mg. dose per day for as long as five months did not show any side reactions. The hypercholesterolemias responded best to the alpha-tocopherol. Butylated hydroxytoluene increased the cholesterol levels in some human subjects by as much as 25 to 30 per cent.

Rabbits receiving the cholesterol and vitamin E showed a delayed rise in serum cholesterol when compared with those on cholesterol without vitamin E.—*Abstract of a paper presented before the American Chemical Society in New York, September 13, 1957, by I. J. Greenblatt, T. D. Cohn, J. Fisher, and P. Goldfien, Beth'-El Hospital, Brooklyn.*

A Study of Japanese Men and Women in Hawaii

Basal Metabolism in the Elderly[1]

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ALTHOUGH THE estimation of protein-bound iodine in blood or the use of radioactive iodine to determine whether the thyroid gland is functioning normally may replace the clinical use of the basal metabolic rate, the energy requirement at rest continues to be important in judging the energy needs of individuals of various ages. What was originally of interest to the physiologist in determining basal energy needs came to be a useful tool for the physician. The number of studies on young and middle-aged people has exceeded those on the elderly. Now that more of the population is composed of people sixty years and older, it is especially desirable that we know more about their basal energy requirements.

In Hawaii, people of Japanese ancestry represent a large segment of the population and, as with other ethnic groups, there is an increasing number of older people. The aim of this study was to compare the basal metabolism of an elderly group of Japanese, determined by means of a respiration apparatus, with the prediction standards of the Mayo Clinic (1) and to test the urinary pigment-creatinine ratio recommended by Vorzimer and Cohen (2, 3). Our results are also compared with those of Kise and Ochi (4), who studied the basal metabolism of ninety-four men and women fifty to ninety-three years of age in Japan.

This paper presents the results of a study of the basal metabolism of thirty-four men and women of Japanese ancestry, sixty to eighty-three years of age who had lived in the Hawaiian Islands for periods varying from thirty-six to fifty-six years.

Experimental Procedure

Thirty-four persons, seventeen men and seventeen women of Japanese ancestry, served as subjects. Their ages, recorded to the nearest birthday, ranged from sixty to eighty-three years. The criteria for selection were: age sixty or over; willingness to cooperate; absence of illness and disease to the subjects' knowledge; and a subjective report of relatively good health from youth to the present time.

All were born in Japan and came to Hawaii in their late teens or early twenties. The period of residence for the men ranged from thirty-nine to fifty-six years and averaged forty-eight years. The women had lived in Hawaii for periods varying from thirty-six to fifty-four years with an average of forty-five years.

Data were collected on the relative activity of each subject with respect to occupation and leisure time pursuits. Three general terms were used: active, moderately active, and sedentary. Seven men were classed as being active, four as moderatively active, and six as sedentary. Their present and previous occupations indicated a cross-section of the community and ranged from business and professional pursuits to hard labor. The men who were still employed full time in jobs which required considerable manual labor, such as gardening, were considered active. Most of the business or professional men were retired.

All the women were or had been homemakers for many years, and in addition three had previously had other work or professions—store owner, midwife, and plantation worker. Even the women who were considered sedentary had regular daily chores in the home and lived relatively active lives.

All subjects were carrying on their usual activi-

[1]Published with the approval of the Director of Technical Paper no. 387 of the Hawaii Agricultural Experiment Station. A portion of the data reported in this paper is taken from a thesis submitted by Alice Kimura to the Graduate School of the University of Hawaii in partial fulfillment of the requirements for the Masters Degree in nutrition. Received for publication March 22, 1957.

ties at the time of the tests. All were living in their own homes or homes of their children. All had erect carriages, were unusually alert, and most appeared to be younger than their stated ages. In summary, it may be said that these men and women had been active all their lives, though some had become sedentary in their later years.

LABORATORY PROCEDURES

Each subject slept at home, came to the laboratory without breakfast, and rested 35 min. or more before the tests were made. During the rest period, pulse and mouth temperature were determined and the technique was explained to the subject. Great care was taken to eliminate apprehension and nervousness, and the ability of two of the authors to speak and give directions in Japanese proved to be a great advantage.

The usual precautions were taken for testing the Benedict-Roth respiration apparatus and having the subjects physically relaxed and emotionally calm. A test constituted two observation periods, 7 to 8 min. in length (and occasionally a third period) for each subject. Pulse rate was taken at least twice during each period. Tests were made on two days, usually not more than one week apart.

Blood pressure was determined in the reclining position at the end of the test and before the subject rose for weighing and measuring. Body surface was estimated in square meters from the DuBois body surface chart prepared by Boothby and Sandiford (5). The heat production was calculated in the usual manner.

For the urinary pigment-creatinine ratio, the methods and precautions of Vorzimer and Cohen (2, 3) were employed. To provide the standard reference curve for creatinine, the best quality creatinine and picric acid obtainable were purified by recrystallization. Carefully standardized techniques were used for preparing solutions and reading samples.

The subjects were instructed to avoid foods such as beets that might affect the pigments of the urine, and since a number of them were taking multiple vitamin capsules, they were requested to omit the capsules or tablets two days prior to the test, as well as on the morning of the test. In this way any effect of excess riboflavin, which might influence the readings, could be avoided. Subjects collected the urine voided on rising in the clean jars provided and brought the samples to the laboratory. A second sample was collected after determination of basal metabolism had been completed and the required measurements made.

Results and Discussion

BASAL METABOLIC RATE

Data on physical characteristics, mouth temperature, pulse rate, and blood pressure are given separately for men and women in Table 1. In Tables 2 and 3, the values for basal metabolism are summarized individually in age groups and by sex, and the deviations from three standards are given.

The mouth temperatures were relatively low, below 98° F., for all the men, and for all of the women, except five who had mouth temperatures of 98.0° F. The pulse rates and blood pressure values averaged lower for men than for women. Blood pressures were within the normal range (except for Female Subject No. *17*), and many were lower than usual for these age groups (6). All subjects were small of stature, and only a few appeared to be overweight. The trunks, as indicated by sitting heights, were relatively long in relation to total height as compared with Caucasians.

The results in terms of calories per hour for each test on different days are given in Table 2. If the results on two days did not agree within 5 per cent, an effort was made to study the subject on a third day, but this was not always possible. For the men, the differences in calories per hour on two separate days were less than 5 per cent for twelve of the seventeen; four were 10 per cent or less; and for one seventy-nine-year-old man, the difference was 14.3 per cent. Similarly for the women, the differences were less than 5 per cent for ten of the seventeen subjects; five were 10 per cent or less; and one was 13 per cent. For Female Subject No. *13*, only one satisfactory test with the respiration apparatus is recorded because the two deviations based on the urinary pigment-creatinine ratio agreed well.

Averages are given for heat production per 24 hr. and per square meter per hour for each subject (Tables 2 and 3). Group averages for calories per square meter per hour are given for subjects with age ranges of five years, e.g., 60 to 64, 65 to 69, 70 to 74, and so on. The average deviations from the Mayo Clinic standards (1) and from the Kise-Ochi (4) standards for all subjects are given as well as the deviations based on the urinary tests.

The basal metabolism for 24 hr. was compared with that obtained by using the Boothby, Berkson, and Dunn (1) smoothed values for calories per square meter per hour for ages in whole years. Table 2 of this reference (1) gives figures up to seventy-five years but not beyond. The comparisons with the values for Japanese men and women studied by Kise and Ochi in Japan (4) were made by using their table of prediction values, which groups the ages for ten-year periods, 60 to 69 and 70 to 79, and Takahira's formula (7) which they recommend for the determination of surface area.

The data in Tables 2 and 3 on our small groups of men and women do not show a general decline in basal energy production with advancing years. These relatively healthy, active men and women of seventy to seventy-nine had just as high basal

metabolism (as indicated by the values for calories per square meter per hour) as did the younger group of sixty to sixty-nine years of age. However, all showed a lower basal heat production than did the young people of Japanese ancestry in Hawaii previously studied by Miller and Benedict (8). The mean calories per square meter per hour for thirty-eight young men, average age twenty-two, was 38.04 and for twenty-three young women, average age twenty-three, 33.71. For the older group, comparative figures were 31.97 for the men and 31.23 for the women.

If the average values for calories per square meter per hour for the men of this study are compared with those for the women, there is but little difference between the sexes in the older group compared with the younger. However, the difference is somewhat greater when the values for three men and one woman who appeared to have abnormally low basal heat production are omitted. Kise and Ochi (4) also observed that the difference in basal heat production between the sexes becomes smaller with age.

When the values for basal heat production per 24 hr. for fifteen men were compared with those obtained by using the Mayo Clinic standards, all but three showed minus deviations. (Two could not be compared because the Mayo Clinic tables provide no standards beyond seventy-five years.) The average deviation was −8.2 per cent for the fifteen subjects, but when the figures for three men who appeared to have abnormally low energy expendi-

TABLE 1 Physical characteristics, mouth temperature, pulse rate, respiration rate, and blood pressure of subjects

SUBJECT	AGE	HEIGHT	WEIGHT	SITTING HEIGHT	BODY SURFACE	MOUTH TEMPERATURE	PULSE RATE	RESPIRATION RATE	BLOOD PRESSURE	
									Systolic	Diastolic
					Men					
	yr.	*cm.*	*lb.*	*cm.*	*sq.m.*	*°F.*			*mm. Hg.*	*mm. Hg.*
1	61	153.8	105.0	86.9	1.42	97.5	60	14	163	96
2	62	162.0	144.5	88.4	1.70	97.0	60	15	138	82
3	63	155.6	149.0	83.9	1.67	97.4	62	12	140	90
4	64	168.0	169.0	89.6	1.86	96.8	54	14	136	85
5	66	157.6	132.0	87.0	1.60	96.8	63	11	137	95
6	67	154.6	123.0	81.7	1.54	97.3	56	13	111	72
7	67	160.2	148.0	86.7	1.70	96.8	60	9	148	90
8	68	164.7	99.0	90.7	1.47	97.3	60	15	134	73
9	68	149.0	95.0	84.3	1.32	97.4	66	13	124	78
10	69	157.3	103.5	85.8	1.44	97.4	51	8	110	65
11	69	157.2	121.0	86.3	1.54	97.4	51	16	130	95
12	70	150.3	81.0	83.3	1.26	97.2	69	22	160	90
13	70	162.4	133.5	87.2	1.64	97.2	58	11	135	88
14	72	157.0	115.5	85.2	1.51	97.6	56	14	138	85
15	75	152.3	127.0	81.4	1.54	97.1	58	10	141	92
16	79	151.8	108.5	81.7	1.42	97.0	70	12	160	95
17	83	166.0	110.0	92.0	1.54	96.4	62	19	157	86
Average	69.0	157.6	121.4	86.0	1.54	97.2	59.8	13.4	139	86
					Women					
1	60	145.8	108.5	81.1	1.42	98.0	72	13	126	74
2	61	150.7	127.5	82.5	1.52	97.9	60	14	120	80
3	63	154.2	139.5	84.7	1.62	97.6	59	13	138	90
4	66	146.2	95.0	81.3	1.32	97.5	72	14	122	74
5	66	148.7	142.0	84.0	1.58	97.7	74	14		
6	67	153.2	136.5	82.6	1.59	97.9	62	14	138	88
7	67	147.2	135.5	80.4	1.54	97.7	56	13	167	90
8	68	140.4	102.5	75.9	1.32	98.1	69	14	150	95
9	68	140.5	97.5	76.6	1.30	97.5	50	16	134	80
10	70	147.1	91.0	79.7	1.30	98.0	64	16	175	54
11	71	146.8	123.0	83.2	1.48	98.0	68	15		
12	72	142.4	105.5	78.6	1.36	97.1	60	10	170	95
13	73	144.4	113.5	77.0	1.41	97.8	70	17	132	80
14	74	149.3	130.0	83.0	1.54	97.7	74	10	162	92
15	75	136.6	107.5	73.9	1.32	98.0	70	12	165	90
16	76	138.2	95.0	75.0	1.27	97.3	58	13	182	90
17	79	152.8	114.5	80.1	1.48	97.8	70	16	212	90
Average	69.2	146.1	115.6	80.0	1.43	97.7	65.2	13.8	153	84

ture (Subjects *4*, *9*, and *13*) and who showed deviations of −18.5 to −26.4 per cent were omitted, then the deviation for the remaining twelve averaged −4.5 per cent. The deviations using the prediction standards of Kise and Ochi (4) showed similar relationships.

The results for the women compared in a like manner showed the average of the deviations from the Mayo Clinic standards to be −3.3 per cent and from the Kise-Ochi (4) standards, −4.7 per cent. Omitting the value for Subject *3*, whose basal metabolism was abnormally low, the average deviation from the Mayo Clinic standards was only −1.7 per cent and from the Kise and Ochi (4) standards, −3.0 per cent.

URINARY PIGMENT-CREATININE RATIO

The use of the urinary pigment-creatinine ratio as a measure of basal metabolism has been recommended by Vorzimer and Cohen (2, 3) for individuals on whom it is difficult to make the usual respiratory test. It is hard to adjust the nose piece for people with flat noses, and those with many missing teeth or with perforated eardrums cannot be given a satisfactory test with the respiration apparatus. In 1951, a Honolulu laboratory reported

TABLE 2 **Basal metabolism of men subjects and deviations from three standards**

SUBJECT	AGE	HEAT PRODUCTION				DEVIATION FROM PREDICTION STANDARDS							
		Per hour		Daily	Related to body surface	Mayo Clinic (1)	Kise-Ochi (4)	Urinary pigment:creatinine ratio					
								On rising			After basal test		
		First day	Second day					First day	Second day	Average	First day	Second day	Average
		Men, Ages 60-64 Years											
	yr.	*calories*	*calories*	*calories/ 24 hr.*	*calories/ sq.m./hr.*	%	%	%	%	%	%	%	%
1	61	48.65	49.05	1172	34.40	− 3.4	− 2.8	− 4.2	− 6.3	− 5.2	− 1.1	− 4.6	− 2.8
2	62	52.65	52.78	1265	31.01	−12.6	−11.7	+ 5.2	− 4.7	+ 0.2	− 4.0	− 3.8	− 3.9
3	63	53.58	55.55	1309	32.67	− 7.8	− 7.6	− 6.6	−10.6	− 8.6	−11.6	− 8.0	− 9.8
4	64	54.98	51.98	1284	28.75	−18.5	−18.5	−13.6	....	−13.6	−11.0	−11.2	−11.1
Average					31.71								
		Men, Ages 65-69 Years											
5	66	57.66	56.56	1371	35.69	+ 2.0	+ 1.0	− 5.6	− 2.9	− 4.2	− 8.8	− 8.5	− 8.6
6	67	50.67	50.79	1218	32.94	− 5.6	− 6.2	− 9.0	−12.9	−11.0	− 6.2	− 6.6	− 6.4
7	67	52.37	54.42	1282	31.41	−10.0	−10.5	− 8.3	−12.6	−10.4	− 5.2	−10.8	− 8.0
8	68	51.13	50.51	1220	34.34	− 1.3	− 1.6	− 9.2	− 9.6	− 9.4	− 5.9	− 7.4	− 6.6
9	68	33.38	34.23	811	25.61	−26.4	−28.3	−12.7	−12.5	−12.6	−10.8	− 7.6	− 9.2
10	69	46.10	47.54	1124	32.51	− 6.3	− 8.1	+ 0.2	− 9.1	− 4.4	+ 3.8	− 8.2	− 2.2
11	69	58.37	54.72	1355*	36.66*	+ 5.6	+ 3.7	− 6.4	+ 3.4	0*	− 9.2	− 4.3	− 4.2*
Average					32.74								
		Men, Ages 70-74 Years											
12	70	45.90	46.64	1110	36.72	+ 6.4	+ 9.8	+ 3.1	− 1.2	+ 1.0	− 3.4	+ 1.8	− 0.8
13	70	43.01	42.77	1029	26.15	−24.2	−22.1	....	−14.0	−14.0	−16.0	−12.9	−14.4
14	72	44.10	43.58	1052	29.03	−14.9	−13.1	− 5.2	− 8.8	− 7.0	− 2.6	+ 1.4	− 0.6
Average					30.63								
		Men, Ages 75-79 Years											
15	75	49.78	47.01	1162	31.43	− 5.8	− 5.8	− 8.5	−11.2	− 9.8	− 6.5	−10.4	− 8.4
16	79	53.55	46.85	1205	35.10	....	+ 4.4	....	− 3.0	....	....	+ 5.0	
Average					33.26								
		Men, Ages 80-83 Years											
17	83	42.42	46.99	1073	29.02	....	−10.0	+ 0.1	+ 0.9	+ 0.5	+ 5.5	+ 4.4	+ 5.0
		All men											
Average					31.97	− 8.2	− 7.5			− 6.6			− 5.1
Average, omitting Subjects 4, 9, and 13					33.07	− 4.5	− 4.2			− 5.1			− 3.7

*Includes a single value for the respiration apparatus for a third day and values for the urine test before and after the basal test on the same day.

using the urinary method for about a thousand cases (9). The results from this test on highly nervous and apprehensive patients, often encountered in clinical work, were regarded as considerably more accurate than the results with the respiration apparatus.

The technique and formulas recommended by Vorzimer and Cohen (2, 3) have been worked out to give values which represent deviations from the normal basal metabolism (rather than an indirect measure of calories) and are so recorded in Tables 2 and 3. Since there are some differences of opinion as to whether the urine collected on rising or after the period of rest under basal conditions is the most satisfactory (9), we compared the results of both. The average values for the urine collected after the basal metabolism test showed a smaller deviation than for the samples collected on rising. This is to be expected since the metabolism is lower during sleep.

The correlations with the other two prediction standards are good for some subjects and poor for others. The three men who showed the greatest minus deviations by the respiration apparatus also showed the greatest minus deviations by the urinary method. Male Subject *9*, whose basal metabolism determined by the respiration apparatus differed from the two prediction standards by more than 25 per cent, showed for the urinary method no greater deviations on either morning than did

TABLE 3 **Basal metabolism of women subjects and deviations from three standards**

SUBJECT	AGE	HEAT PRODUCTION				DEVIATION FROM PREDICTION STANDARDS							
		Per hour		Daily	Related to body surface	Mayo Clinic (1)	Kise-Ochi (4)	Urinary pigment:creatinine ratio					
								On rising			After basal test		
		First day	Second day					First day	Second day	Average	First day	Second day	Average
					Women, Ages 60-64 Years								
	yr.	*calories*	*calories*	*calories/ 24 hr.*	*calories/ sq.m./hr.*	%	%	%	%	%	%	%	%
1	60	40.63	42.61	999	29.31	−10.6	−11.0	−16.4	−15.2	−15.8	−13.6	−14.6	−14.1
2	61	49.94	47.01	1164	31.89	− 2.8	− 5.0	− 2.8	− 9.5	− 6.2	− 2.5	−10.7	− 6.6
3	63	39.42	36.86	915	23.54	−27.8	−29.5	−20.3	−17.6	−19.0	−17.3	−13.2	−15.2
Average					28.25								
					Women, Ages 65-69 Years								
4	66	46.54	46.16	1112	35.11	+ 8.7	+ 5.9	− 6.6	−14.3	−10.4	− 4.1	−11.4	− 7.8
5	66	51.79	52.03	1246	32.85	+ 1.7	− 2.1	− 8.4	− 5.4	− 6.9	− 3.1	− 2.8	− 3.0
6	67	47.88	45.64	1122	28.41	− 9.0	−12.4	−14.0	−15.2	−14.6	− 4.9	−11.3	− 8.1
7	67	46.25	47.75	1128	30.52	− 5.5	− 9.1	−11.3	−11.0	−11.2	−11.8	− 5.9	− 8.8
8	68	46.09	40.72	1042	32.88	+ 1.8	− 1.5	−13.0	−16.7	−14.8	− 3.1	− 5.2	− 4.1
9	68	35.80	37.63	881	28.25	−12.6	−15.5	−11.2	−21.0	−16.1	−13.5	−19.7	−16.6
Average					31.50								
					Women, Ages 70-74 Years								
10	70	46.67	46.78	1121	35.94	+11.5	+11.8	+ 2.8	+ 9.6	+ 6.2	+ 4.7	+11.7	+ 8.2
11	71	50.83	51.64	1230	34.62	+ 7.9	+ 7.8	− 6.2	− 1.5	− 3.8	− 5.8	+ 1.5	− 2.1
12	72	45.50	44.10	1075	32.94	+ 2.6	+ 2.5	−12.7	− 8.5	−10.6	−10.1	− 7.7	− 8.9
13	73	....	44.48	1068	31.55	− 1.7	− 1.7	−11.3	−10.2	−10.8	− 7.1	− 6.5	− 6.8
14	74	46.67	45.95	1111	30.07	− 6.1	− 6.4	−11.1	− 9.8	−10.4	−11.1	− 2.6	− 6.8
Average					33.02								
					Women, Ages 75-79 Years								
15	75	38.43	39.02	929	29.33	− 8.4	− 9.5	−17.2	−20.9	−19.0	−16.4	−19.3	−17.8
16	76	41.12	37.72	946	31.04	− 3.0	− 3.5	−13.0	+ 1.9	− 5.6	−13.5	+ 4.1	− 4.7
17	79	48.76	45.05	1126	31.69	....	− 1.3	− 0.5	− 7.4	− 4.0	− 6.0	− 5.1	− 5.6
Average					30.69								
					All Women, Ages 60-79 Years								
Average					31.23	− 3.3	− 4.7			−10.2			− 7.6
Average, omitting Subject 3					31.71	− 1.7	− 3.0			− 9.6			− 7.1

some of the others whose respiratory basal appeared normal. The urinary method would have indicated slightly lower than normal basal metabolism (if ±10 per cent of the standard is considered normal) for Male Subjects *4*, *9*, and *13*, whereas the respiratory method indicated abnormally low values.

With few exceptions, the urinary tests for the women showed greater negative deviations from the normal than did the respiratory method. Female Subject No. *10* showed a higher than normal basal metabolism by all standards, although the respiration method showed a greater plus deviation than the urinary method. Subjects *11* and *12* showed plus deviations by the respiratory method and minus deviations by the urinary method.

Without a much more extensive study it would be impossible to say whether the urinary method is a reliable one for determining deviations in the basal metabolic rate for older men and women of Japanese ancestry, but clinically it might be useful.

The generally lower values for basal metabolism compared with those of the Mayo Clinic and the Japanese standards may be due in part to the warm environmental temperature in Hawaii as compared with Minnesota and Japan. The work of Mason (10) has clearly demonstrated that basal metabolism is reduced in tropical and subtropical climates. The Committee on Calorie Requirements for the Food and Agriculture Organization of the United Nations, when considering total energy needs, recommended tentatively, that for every 10 degrees increase in temperature (above the reference temperature of 10° C.) there should be a 5 per cent decrease in energy requirements (11).

Keys (12) has pointed out that in his studies of young men for whom environmental and emotional conditions were nearly ideal, the basal metabolism tended to be roughly 10 per cent lower than the Mayo Clinic and other similar standards. Since much effort was made to have our subjects reassured and in a relaxed state, true basal metabolism levels may have been obtained more often than is usual in clinical practice.

It would appear from the results obtained on this group of thirty-four men and women that the prediction standards of the Mayo Clinic and those of Kise and Ochi (6) may be considered about 5 per cent too high for men and women of Japanese ancestry living in Hawaii who are sixty to seventy-five years of age. This is in general agreement with the results found for larger groups of young men and women of Japanese ancestry previously studied by Miller and Benedict (8).

Summary and Conclusions

Thirty-four persons, seventeen men and seventeen women of Japanese ancestry, sixty to eighty-three years of age, who had lived in Hawaii for periods varying from thirty-six to fifty-six years served as subjects. Basal metabolism was determined by the Benedict-Roth respiration apparatus, and deviations from the normal were estimated by the urinary pigment-creatinine ratio. The results were compared with the standards of the Mayo Clinic for Caucasians and with those of Kise and Ochi for Japanese subjects in Japan. Omitting the data for several subjects who appeared to have abnormally low basal metabolism, the two prediction standards seem to be about equally good for the men, but the Mayo Clinic standards appeared to be better for the women.

Urine samples collected on rising usually indicated greater minus deviations from normal basal metabolism than did those collected after the respiratory test.

Since the data showed minus deviations from standard prediction tables for the majority of the subjects, and the different averages of the deviations varied from −3.3 to −8.2 per cent, it is suggested that any prediction standard which has been prepared for temperate climates should be reduced by 5 per cent to give a more satisfactory standard for Hawaii.

The results obtained on these healthy, active men and women sixty to eighty-three years of age showed no clear cut evidence of a decrease in basal metabolism within this age span. There was little difference in basal heat production between the two sexes compared with that evident in younger groups.

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BIOGRAPHICAL NOTES FROM THE HISTORY OF NUTRITION

Edwin Bret Hart—December 25, 1874–March 12, 1953

"To tell the complete story of the life of Edwin Bret Hart would involve the writing of a complete history of nutrition during the first fifty years of this century," according to one of his pupils and co-workers, Conrad Elvehjem, who was joint author of many of his papers from 1924 until his last publication in 1953. Hart was not only born in time to see nutrition develop into a science, but he was one of the most active of those teachers and research workers who helped to make it a science.

Edwin Bret Hart was born December 25, 1874, near Sandusky, Ohio. He was the youngest of fourteen children born to William and Mary Hess Hart. His mother died while he was an infant, and his brothers and sisters raised him. He graduated from high school in 1892 and went to the University of Michigan to study chemistry and medicine, but chemistry became his major interest, and in 1897, he went to the New York Experiment Station at Geneva where his interest in experimental work was stimulated. Two years' study at Marburg and then Heidelburg under the famous biochemist, Albert Kossel, gave him the foundation for experimental work in food and nutrition to which he devoted the rest of his life. After his return from Germany and four more years at the Geneva Experiment Station, he accepted the invitation to be Head of the Department of Agricultural Chemistry and Chemist in the Experimental Station at the University of Wisconsin (1906).

Hart was co-author of 384 papers which literally cover the field of nutrition, although his greatest contributions were to our knowledge of minerals and vitamins. He was co-author of that classic, Bulletin 17 (see reference below), which laid the foundation for much of the modern research in nutrition, and he pioneered in studies of phosphorus in nutrition. Hart's group played an important part in the discovery that iodine will prevent goiter in animals; he advocated the use of iodized salt for human beings and developed a method for stabilizing iodine in salt. The importance of iron in nutrition was the subject of investigation from 1923 on, and culminated in the discovery that copper is essential for the utilization of iron in building hemoglobin. He demonstrated the importanec of manganese and zinc in the animal body and studied other trace elements. Many research studies dealt with vitamins A and D, and the B group.

Hart recognized the importance of cooperation in research and many graduate students were attracted to his laboratory; forty-six obtained their doctorate degrees under him, and scores of others received help from him. Many people in industry and agriculture came to him for advice and his answer was always the same—obtain the needed facts through research.

Many honors and recognitions came to Hart. He was a charter member of the American Institute of Nutrition, an honorary Phi Beta Kappa, Doctor of Science from the University of Wisconsin (1949), and in 1944 was elected to the National Academy of Sciences, an honor which he treasured. He received the Borden Award of the American Dairy Association in 1941.

Edwin Bret Hart married Annie Virginia DeMille in 1903. They had one daughter. He officially retired from chairmanship of the Department of Agricultural Chemistry in 1945, and friends and colleagues presented his portrait to the Department at that time. After retirement, he continued daily work in his laboratory and was there on March 11, 1953; he died the following day of a coronary attack.

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Milk Drinking by College Students[1]

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THE DIETARY habits of college students are of interest in part because they represent an important segment of the students' adjustment to a new way of living. For many, it is their first experience in a situation in which they have an opportunity to make their own food selection.

A comparison of food selection of college men and women by Latzke (1) indicated that the most striking difference in the food choices was found in the use of milk. In a study on self-selected diets of college men and women, Lautz *et al.* (2) reported that 40 per cent of the meals selected by the men included milk while only 24 per cent selected by the women included milk. The work of Blewett and Schuck (3) also showed that the men consumed considerably more milk than women, 10.34 pt. per week as compared with 7.84 pt. for women.

The present investigation was designed: (a) to ascertain the milk-drinking habits of college students by use of a questionnaire and (b) to observe the beverage preference of college men and women at the three meals for three seasons.

Procedure

EXPERIMENT 1

For the first part of the investigation, twenty men and twenty women were selected at random from the freshman, sophomore, junior, senior, and graduate classes of the University of Georgia, making a total of 200 students. A questionnaire was developed for use in obtaining information on the student's home background and earlier experiences which might influence his milk-drinking habits. The questionnaire was completed during a personal interview with each of the 200 students.

EXPERIMENT 2

This experiment took the form of a beverage preference survey conducted in one of the college cafeterias which served about three hundred students daily. Each student's tray was checked for selection of beverage at breakfast, lunch, and dinner on Monday through Friday of three consecutive weeks in three consecutive seasons. The surveys were conducted the third, fourth, and fifth weeks in the fall, winter, and spring quarters of 1955. During the entire test period of 45 days, a total of 43,056 trays were checked, 32,039 belonging to women and 11,017 to men. The choice of breakfast beverages consisted of milk, chocolate drink, coffee, and hot tea. The lunch and dinner beverage choices were iced tea, milk, chocolate drink, coffee, and occasonally fruitade.

Results

EXPERIMENT 1

Results obtained through the questionnaire indicated that 47 per cent of women and 38 per cent men students were from cities of over 25,000 population. The same number of students came from small towns of less than 2,500 population, as did from farms. Twice as many men as women students came from farm homes.

The interviews with the students also revealed that: (a) the age of the parents ranged from thirty-five to forty-nine years; (b) 55 per cent of the parents had a high school education or less; (c) 79 per cent of the students were from families of one to three children; (d) 41 per cent of the women and 17 per cent of the men did not know their parents' income; (e) of the students who knew, 75 per cent of the women reported their parents' income as $5,000 or over compared with 56 per cent of the men's parents in this income bracket.

Data on the amount of money spent for food per week showed that 68 per cent of the women versus 58 per cent of the men spent from $10 to $14.99 for food per week. Fifty-one per cent spent one dollar per week or more for milk. The men spent an average of 8.6 per cent of their food dollar for milk

[1]Received for publication May 13, 1957.

[2]Present address: Manhattan College, Riverdale, New York 71.

TABLE 1 Frequency per day of milk drinking at home and at school

MILK CONSUMED	AT HOME			AT SCHOOL		
	Women	Men	Total	Women	Men	Total
			At Mealtime			
	%	%	%	%	%	%
Three glasses	33.3	29.5	31.4	10.1	15.8	12.9
Two glasses	19.2	33.7	26.3	17.2	25.3	21.1
One glass	18.2	18.9	18.6	37.4	30.5	34.0
			Between Meals			
Three glasses	5.6	1.1	3.6	0	3.2	1.5
Two glasses	5.6	7.4	6.1	7.7	4.2	5.7
One glass	19.2	21.1	20.1	19.2	14.7	17.0
			Other Times			
Sometimes	12.1	10.5	11.3	15.2	21.1	18.0
Never	12.1	6.3	9.3	11.1	7.4	9.3

while the women spent 7.2 per cent, with the graduate students leading for the men and the seniors for the women.

Two-thirds of the students replied in the negative to the question, "Would you spend more money for milk if you had an unlimited allowance?" However, more men than women indicated that they would have spent more money for milk. The main reason for not spending more money for milk was that they already drank enough. Only three women used "fattening" as the reason for not spending more money for milk and two students reported physician's instruction.

The frequency per day of drinking milk at home and at school is shown in Table 1.

Over twice as many students drank three glasses of milk per day at mealtime when at home, than at school. Likewise, the 26 per cent who drank two glasses a day at mealtime at home, dropped to 21 per cent at school. The percentage of students who stated they never drank milk was 9.3 per cent both at home and at school. Thirteen subjects who never drank milk reported they disliked its taste. The remaining non-milk drinkers disliked it because a thinner beverage was preferred, the after-taste was disliked, it caused an allergy, it was not accessible, and for financial reasons.

The reasons given for drinking milk at home are shown in Table 2. The majority, 59 per cent, drank milk at home because they liked it, 5 per cent drank it because it was put before them, and 2 per cent drank it because their mothers made them.

To the question, "Were you ever forced to drink milk at home?" 23 per cent of the women and 12 per cent of the men replied in the affirmative. Forty-eight per cent of the subjects were allowed to choose their meal beverage during childhood. There were twice as many men as women who were not allowed to choose their mealtime beverage during adolescence; however, the percentage for this group was only 6. All students checked parents when asked who had influenced them to drink milk. Some of the other leading influences were the elementary teacher, the dentist, and the physician.

TABLE 2 Reasons for drinking milk at home

REASON	WOMEN		MEN		TOTAL	
	Number	Per cent	Number	Per cent	Number	Per cent
Like it	58	58.6	57	60.0	115	59.3
Accessible	8	8.1	9	9.5	17	8.8
Available	3	3.0	12	12.6	15	7.7
Put before me	6	6.1	3	3.2	9	4.6
Nutritious	3	3.0	5	5.3	8	4.1
Habit	4	4.0	4	4.1	8	4.1
Mother makes me	4	4.0	0	0	4	2.1
Never drink it	13	13.1	5	5.3	18	8.8
Total	99	99.9	95	100.0	194	99.5

When asked what nutritious elements were present in whole milk, a majority, 62 per cent, named calcium. Protein, fat, and vitamin D were named by one-third. Five per cent of the men reported no milk was needed after twenty years of age. Four per cent of the women and 7 per cent of the men stated that sixteen- to twenty-year-olds needed only 1 cup of milk a day. More women than men replied that 4 cups were needed by children. Furthermore, more men than women did not know how much milk was needed by the different age groups.

The replies to, "Do you drink as much milk at school as you want?" indicated that 22 per cent did not, the reason given by twenty-five of these students being financial. Ten reported it was not available, six responded it was not accessible, and two thought it was fattening.

Responses to the question, "What would cause you to increase the amount of milk you drink?" showed that nothing would cause one-fourth of the students to do so. Recommendation by the physician would cause 23 per cent to drink more, 16 per cent would drink more if it were more accessible, and 3 per cent would drink more if it were put before them. Money was a factor with 15 per cent, as 9 per cent replied, "lower cost," and 6 per cent indicated an increased allowance would cause them to drink more milk.

Twenty-eight per cent replied in the negative to: "Do you find milk in the dining halls as cold as you would like it?" The comparison of the amount of milk consumed in summer and winter is summarized in Table 3. During the summer, 1 per cent more students consumed milk at mealtime than in winter. However, between meals in the summer 16 per cent more students drank it than in the winter.

The results of the questionnaire indicated that there were twice as many soft drink dispensers in the college residences as milk dispensers. Fruit juice dispensers were not available in any of the college residences.

Suggestions made by the participants for ways of

TABLE 3 Comparison of amount of milk consumed in summer and winter

SEASON	WOMEN		MEN		TOTAL	
	Number	Per cent	Number	Per cent	Number	Per cent
			At Mealtime			
Summer	24	24.2	31	32.6	55	28.4
Winter	30	30.3	23	24.2	53	27.3
No difference	45	45.5	41	43.2	86	44.3
			Between Meals			
Summer	33	33.3	32	33.7	65	33.5
Winter	20	20.2	10	10.5	30	15.5
No difference	46	46.5	53	55.8	99	51.0

increasing milk consumption among the college students were: making more vending machines available; better education of the students as to the importance of milk; reduction of the cost of milk; more advertising with posters, radio, and television; serving colder milk; and including milk in the meals in fraternity and sorority houses.

EXPERIMENT 2

The beverages selected for breakfast, lunch, and dinner by cafeteria users are shown in Table 4. Coffee was the most popular beverage at breakfast, and iced tea was the most popular at lunch and dinner. Milk was the second choice and chocolate drink the third choice at all three meals.

The data on the consumption of each beverage was statistically analyzed, and the data disclosed a highly significant difference in the choice of milk as a beverage among the seasons and between the sexes. Less milk was selected in the winter and spring than the fall. The mean percentage of women selecting milk was 28 compared with 36 for the men.

There was also a highly significant difference among the seasons and between the sexes in the selection of chocolate drink. Less chocolate drink was chosen during the winter and spring than fall, and more men than women selected it. The percentage of women selecting chocolate drink was about the same for the three meals, whereas the men chose more chocolate milk at lunch and dinner than at breakfast.

Analysis of variance of the data for iced tea disclosed a highly significant difference among seasons. More iced tea was selected in the spring than the fall and winter. Statistical analysis of the coffee data disclosed that the consumption of coffee in the fall and winter as compared with spring was highly significant. Little coffee was consumed at lunch and dinner.

Discussion

IN this study, 11 per cent of the women and 7 per cent of the men never drank milk at school. The figure for the men is in agreement with the findings of Coles (4) who reported that 7 per cent of the men students in a sixteen- to twenty-year group in Oakland, California, did not drink milk. Furthermore, the Los Angeles findings in the same study indicated that 8 per cent of the subjects in this age group never drank milk. However, the author also reported that 17 per cent of the girls in the Oakland survey did not drink milk.

TABLE 4 Beverage selection at breakfast, lunch, and dinner for the three seasons

SEASON	MILK		CHOCOLATE DRINK		ICED TEA		COFFEE	
	Women	Men	Women	Men	Women	Men	Women	Men
				Breakfast				
	%	%	%	%	%	%	%	%
Fall	34.8	45.8	7.3	6.1	0.5	0	56.8	60.0
Winter	34.1	39.8	5.9	2.7	0	0	63.6	66.5
Spring	37.2	41.9	4.8	4.7	0.1	0.1	57.0	58.2
Average	35.4	42.5	6.0	5.5	0.2	0.03	59.2	61.6
				Lunch				
Fall	26.0	33.7	6.9	11.5	64.6	63.4	1.4	5.2
Winter	30.9	34.1	6.1	13.1	59.3	65.8	1.4	5.0
Spring	15.7	32.7	4.3	3.0	79.2	74.2	0.3	0.2
Average	24.2	33.5	5.8	10.9	67.7	67.8	1.0	3.5
				Dinner				
Fall	25.4	34.7	6.4	12.0	66.3	62.5	2.4	3.4
Winter	22.9	34.1	5.9	12.0	58.7	64.2	4.2	3.7
Spring	16.5	29.6	4.3	5.9	78.6	77.9	1.1	0.7
Average	23.9	32.8	5.5	10.0	67.9	68.1	2.6	2.6

The findings in the present study are higher than these of Hall and Hall (5), who found that 3 per cent of the students in three colleges disliked milk. Likewise, Reynolds *et al.* (6) reported that 3 per cent of the students did not drink milk in a survey of six North Central states colleges. Similarly, Young and Storvick (7) reported that 3 per cent of the freshmen at Oregon State College did not drink milk.

The survey of student's trays in the college cafeteria disclosed that 28 per cent of the women and 36 per cent of the men selected milk. This figure for the women is not in accordance with the findings of Latzke (1) who reported that at only one meal in the day did the number of women students selecting milk exceed 20 per cent. Likewise, Lautz *et al.* (2) reported that only 24 per cent of the women students selected milk with meals. These authors also found that 40 per cent of the men students selected meals which included milk, whereas in the present study, the figure is only 36 per cent.

The cafeteria survey showed that the percentages of women selecting milk at breakfast, lunch, and dinner were 35, 24, and 24, respectively. These figures are much lower than those of Scoular and Foster (8) who reported comparable percentages for women's trays at North Texas State College to be 50, 70, and 70.

In this study it was not determined whether the students of parents with higher education drank

more milk than those of less education. However, since 61 per cent of the mothers of men students had no more than a high school education compared with 49 per cent of the mothers of the women students, it appears that education of the parents had no effect on the amount of milk these subjects drank.

The income level of parents did not appear to be an important factor in the number of students who chose milk, either. Although the data showed that the men chose significantly more milk than the women, more of the women's parents fell in the higher income brackets. This comparison is based on the percentage of income levels given by the students who knew their parent's income. However, this might not have been true if all the incomes had been reported, since 41.1 per cent of the women did not know their parents' income, compared with 16.9 per cent of the men.

Although the women spent more money for food per week, the men spent more money for milk per week. Also, the average share of the food dollar spent for milk per week was greater for the men than the women. Furthermore, a greater percentage of the men than women reported they would be willing to spend additional money for milk. Even though the women had a better knowledge of the amounts of milk needed by individuals at the different age levels, the men drank more milk. Interestingly, only three women reported they did not drink as much milk as they wanted because they thought it was fattening. The fact that twice as many women as men had been forced to drink milk when young may have accounted for the greater number of non-milk drinkers among the women. However, too much liberty in the choice of beverages given during childhood may not be conducive to the forming of good milk-drinking habits at the most important time when eating habits are established. Since the students reported the greatest influence on drinking milk (besides parents) had been the elementary teacher, while the least amount of credit was given to the college teacher, it appears that milk-drinking habits were well established by the time the students reached college.

The cost of beverages—in the college cafeteria and some commercial establishments—was not conducive to the drinking of more milk as the students could get as many servings of tea and coffee as desired with a meal for 5 cents, while one serving of milk cost 10 cents. Furthermore, in the spring when the weather was warmer, there was a desire for an increased amount of beverage. Hence, with no charge made for second servings of tea and additional servings of milk not allowed unless an extra charge was made, the consumption of iced tea increased in the spring while consumption of milk and chocolate drink decreased.

Summary

Personal interview of 200 students indicated that 9.3 per cent of the students never drank milk at school. The men students spent 8.6 per cent of the food dollar for milk, whereas the women spent 7.2 per cent. Forty-eight per cent of the subjects had been allowed to choose their mealtime beverage at home during childhood. The greatest past influence besides parents in drinking milk came from the elementary teacher and the least influence from the college teacher.

Observation of 43,056 trays in a college cafeteria revealed that the selection of milk by the men students was greater than that by the women; 28 per cent of the women's trays contained milk versus 36 per cent of the men's. There was a greater selection of chocolate drink and coffee by the men than women, whereas a greater percentage of the women than men selected tea.

At breakfast, 60 per cent of the students' trays contained coffee and 39 per cent contained milk. At lunch and dinner, 67.7 per cent of the women and 68 per cent of the men selected iced tea and 29 per cent and 28.4 per cent respectively, selected milk.

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More babies than ever before are being born in hospitals and more live births are being attended by physicians. In 1956, almost 95 per cent of the babies born in the U.S. were delivered in hospitals, and 97 per cent by doctors. Comparable figures for 1935 were 63 per cent and 13 per cent respectively.—*Health Information Foundation.*

Caloric Value of Food Served in a Woman's Residence Hall[1]

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IN 1932, Coons and Schiefelbusch (1) reported that the habitual food consumption of college women was lower than it was a generation earlier and lower among Oklahoma women than among women whose intake was reported in other sections of the United States. The Oklahoma women had diets similar in caloric content to those of an undernourished group of college women whose intake was studied by Blunt and Bauer (2) at the University of Chicago in 1922.

A more recent study done in 1956 reported by Davis and Scoular (3) for eighty-nine young Texas college women concurs with the findings of Coons and Schiefelbusch (1). Davis and Scoular also determined the total fuel value (composite food, beverage milk, sugar, and carbonated-beverage sugar) of foods and beverages consumed during five-day intervals. Sixty-six of the eight-nine women (74 per cent) were within the weight range for height yet consumed fewer calories than the National Research Council's recommended daily allowance which had been lowered by 5 per cent for the warmer climate of Texas. Odland *et al.* (4) in calculating caloric intake of 100 women candidates for the Montana State College freshman class, found a wide range in the seven-day intake with an average of 2060 calories which is similar to that found by Davis and Scoular (3), namely 2100 to 2158 calories for women under and over twenty years, respectively. Although Nygreen (5) estimated the daily protein, thiamine, riboflavin, and ascorbic acid of the food provided in the women's residence halls at the University of Washington, she did not calculate the caloric value of the foods provided.

It is recognized that not all of the food provided at meal time may be eaten (especially breakfast) and that snacks may be eaten between meals. Nevertheless, it is of interest to know the actual determined fuel value of the food provided in a woman's residence hall. Consequently, the present study was undertaken to determine the fuel value of the foods provided for women eating three meals in a residence hall.

Procedure

To determine the caloric content of food served at Mary Hardin—Baylor College, Belton, Texas, samples of food and plate waste were collected for seven days' meals during the spring of 1956. Although the food was served family-style in platters and bowls, the quantity provided was sufficient to serve similar-sized portions to each girl at the table. However, second servings were usually available for those desiring them. Two beverages were also provided at each meal for those wishing them: milk and coffee at breakfast, and milk and tea at the noon and evening meals. Oleomargarine and both white and whole wheat bread were available for extra servings even when hot breads were served.

Food portions identical (including the hot bread when on the menu) to those served to each girl were collected after each meal. The composite food of each meal was weighed before it was ground, blended in a Waring Blendor, dried in a gas oven at a temperature below 200°F. and again weighed. Moisture determinations were obtained by the difference in weight of the wet and dry samples. The samples of bread alone, both sliced bread and hot bread, were obtained in a similar manner. Plate waste was collected in a weighed container at the end of each meal and the total contents weighed; a homogeneous sample of the plate waste from each meal was then blended and dried for analysis.

Triplicate samples of all food and plate waste were burned in a Parr oxygen bomb calorimeter and their caloric values computed.

[1]Presented in partial fulfillment of the requirements for the degree of Master of Science in foods and nutrition by Mary Robinson. Received for publication December 27, 1956.

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TABLE 1 Daily caloric values of individual meals, with and without plate waste deductions

DAY	CALORIES			
	Composite	Composite plus milk	Composite plus bread	Composite plus milk and bread
Breakfast				
1	458	624	535	701
2	911	1077	988	1154
3	740	906	817	983
4	690	861	772	938
5	550	716	627	693
6	761	827	838	1004
7	370	536	447	613
Average food served	640	792	718	884
Average food served less average breakfast plate waste*	528	680	606	772
Noon Meal				
1	1050	1216	1127	1293
2	722	888	799	965
3	1003	1169	1080	1146
4	743	909	820	986
5	920	1086	997	1163
6	849	1015	926	1092
7	760	926	837	1003
Average food served	864	1030	941	1093
Average food served less average noon plate waste†	755	921	832	984
Evening Meal				
1	720	886	797	963
2	786	952	863	1029
3	804	970	881	1047
4	662	828	739	905
5	973	1139	1050	1216
6	945	1111	1022	1188
7	606	772	683	849
Average food served	785	951	862	1028
Average food served less average evening plate waste‡	759	925	836	1002
Daily Totals				
Average food served	2289	2773	2521	3005
Average food served less average daily plate waste	2042	2527	2274	2758

* Breakfast plate waste ranged from 46 to 178 calories, with an average of 112.

† Noon plate waste varied from 17 to 249 calories, with an average of 109.

‡ Evening plate waste (from six meals only) ranged from 14 to 94 calories, with an average of 56, which accounts for apparent discrepancies in subtractions.

Discussion of Results

In Table 1 the caloric values of the food composites are given together with (a) the caloric value of a serving of milk, (b) a serving of bread, and (c) a serving of bread and of milk. The total caloric values for each of these food combinations is also given after plate waste has been subtracted. The breakfast composites (menus for all meals given in Table 2) provided an average of 640 calories with a range of 370 to 911. An extra slice of bread and a glass of milk increased this average to 884 calories. The breakfast meals varied more (100 per cent) than any of the other meals for the seven days studied.

When the average plate waste was taken into consideration, the breakfast values became 528 calories without additions and 681, 606, and 772 with the addition of milk, bread, and bread and milk, respectively. The least plate waste occurred with the breakfast menu containing no prepared cereal and the highest with the breakfast containing prepared cereals. While the plate waste from the breakfast meals varied considerably, 46 to 178 calories (an average of 112 calories), it varied less than the noon values of 17 to 249 calories (average of 109 calories).

The day-to-day variation in the fuel value of the noon meal was less than that for either the breakfast or the evening meals. The range was from 722 to 1050 calories with an average of 864. The menus which included dried beans (pinto and Lima) not only provided the highest caloric values (1050 and 1003), but also the highest plate waste (249 and 132 calories). With the inclusion of beverage milk, an additional serving of bread, or of bread and milk, the noon meals provided 1030, 941, and 1093 calories without plate waste deductions and 755, 921, 832, and 984 calories with the deductions.

The caloric values of the evening menus varied less than the breakfast but more than the noon menus. The range of calories from the evening meal was 606 to 973 with an average of 785 calories. Although one day's plate waste was not available, the range and average was less than either of the other two meals, namely from 14 to 94 with an average of 56 calories. With the inclusion of beverage milk, an additional serving of bread, or of bread and milk, the evening meal provided 951, 862, and 1028 calories without plate waste and 759, 925, 836, and 1002 calories with plate waste deductions.

Consequently, it is assumed that the total calories (Table 1) of the food composite of each meal and the day's total calories were available to those who left no plate waste. Those who had plate waste may have received about the number of calories given at the bottom of column one which was obtained by subtracting the average daily plate waste calories from the composite total calories. In any case, those with no plate waste received an average of 2289 calories per day and those with plate waste about 2042.

Table 2 Menus served on days food was collected for caloric determinations

BREAKFAST	NOON MEAL	EVENING MEAL
First Day		
Tomato juice	Barbecued beef	Luncheon meat
Pep plus ½ c. milk	Pinto beans	Fried potatoes
Bacon	Vegetable salad	Sliced tomatoes
Figs and jelly	Corn bread	Whole wheat bread
Biscuit	Blueberry cobbler	White bread
Toast	Milk	Ice cream
Milk	Tea	Milk
Coffee		Tea
Second Day		
Tomato juice	Smothered liver	Hamburger steak
Puffed Wheat plus ½ c. milk	Broccoli	Corn
Sausage	Potatoes	Green beans
Jelly and preserves	Vegetable salad	Peach pickle
Biscuit	Corn bread	Whole wheat bread
Toast	Doughnuts	White bread
Milk	Milk	Ice cream
Coffee	Tea	Milk
		Tea
Third Day		
Grapefruit	Fried steak with gravy	Beef stew
Raisin Bran plus ½ c. milk	Carrots	Turnip greens
Scrambled eggs	Lima beans	Pickled beets
Cherry preserves	Vegetable salad	Whole wheat bread
Biscuit	Corn bread	White bread
Toast	Cherry pie	Fruit cup
Milk	Milk	Milk
Coffee	Tea	Tea
Fourth Day		
Grape juice	Steak with gravy	Chicken noodles
Scrambled eggs	Potatoes	English peas
Peach preserves	Green beans	Peach pickle
Muffin	Fruit salad	Whole wheat bread
Toast	Corn bread	White bread
Milk	Chocolate pie	Ice cream
Coffee	Milk	Milk
	Tea	Tea
Fifth Day		
Orange juice	Roast beef and gravy	Salmon croquettes
Grape Nuts plus ½ c. milk	Squash	Brussels sprouts
Scrambled eggs	Green beans	Peach and cheese salad
Fig preserves	Beet salad	Whole wheat bread
Biscuit	Corn bread	White bread
Toast	Coconut pie	Sherbet
Milk	Milk	Milk
Coffee	Tea	Tea

TABLE 2 (Concluded)

BREAKFAST	NOON MEAL	EVENING MEAL
Sixth Day		
Whole orange	Liver and onions	Pimiento cheese
Rice Krispies plus ½ c. milk	Broccoli	Fried potatoes
Scrambled eggs	Corn	Tomatoes and lettuce salad
Jelly	Spiced peaches	Whole wheat bread
Muffin	Corn bread	White bread
Toast	Chocolate pie	Ice cream
Milk	Milk	Milk
Coffee	Tea	Tea
Seventh Day		
Apple juice	Roast beef	Tuna fish salad
Shredded Wheat plus ½ c. milk	Turnips and greens	Potato chips
2 slices bacon	Radishes and onions	Tomato and lettuce salad
Grape jelly	Corn bread	Whole wheat bread
Muffin	Peach cobbler	White bread
Toast	Milk	Apple cake
Milk	Tea	Milk
Coffee		Tea

Even with the deductions for plate waste, the total was higher than the daily range of 1475 to 2003 determined calories with an average of 1663 calories for composite foods of self-selected diets consumed by young Texas college women reported by Scoular and Davis (6). It is assumed that if the three daily meals provided in the residence hall of the present study were eaten, the composite foods alone would approximate the National Research Council's recommended caloric allowance for women of this age group living in a warm climate (7). Those consuming beverage milk, additional bread, or bread and milk, would obtain considerably more even after plate waste had been deducted, namely, 2527, 2274, and 2758 calories per day.

Summary

Caloric values for seven days' foods served in a college residence hall for women were determined by use of the bomb calorimeter. Composites of breakfast foods ranged in caloric value from 370 to 911, with an average of 640. Caloric value of composites of foods served at the noon meal varied from 722 to 1050, with an average of 864 calories. Seven days' composites of foods served in the evening ranged from 606 to 973, with an average of 785 calories.

Average caloric values for plate waste for the three meals averaged 112, 109, and 56 calories for breakfast, noon, and evening, respectively.

Total calories determined from the daily food composites averaged 2289. With the deduction of average plate waste, 277 calories, the total was 2042.

If a glass of milk was drunk at each meal, the total might become 2773 calories. The inclusion of second servings and/or a serving of bread correspondingly increased the total possible caloric intake.

If three meals provided in the residence hall were eaten, the recommended caloric allowance for women of this age group should be met.

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Nutrition in Tuberculous Adolescents

Nutrition has been one phase of a twenty-eight-year investigation of childhood tuberculosis. One finding of significance has been the good correlation between the healing of the disease and the maintenance of an adequate nitrogen balance. Conversely, failure of nitrogen storage was followed by a spread of the disease.

Since nutritional factors could be shown to relate so directly to the course of the disease, a study of adolescent metabolism was made to learn the food requirements of this period of rapid growth and to note in particular the effect of nitrogen and calcium on the various phenomena of adolescence.

Weight gain in tuberculous adolescents is an unreliable measure of the nutritional state, while nitrogen balance reflects muscle building and activity and is thought to have a bearing on the development of resistance to infectious disease. Healing in tuberculosis does take place with weight loss, provided nitrogen retentions are adequate. On the other hand, a spreading of the disease can be observed with a weight gain without nitrogen storage.

Adolescence was shown to be characterized by two contrasting types of metabolic processes: (a) the pre-pubertal period, in which the accelerated rate of growth was accompanied by a relative increase in the basal metabolic rate and an enhanced capacity to retain nitrogen and calcium and (b) the post-pubertal period, marked by a deceleration in the growth rate and a diminished ability to retain nitrogen and calcium.

The post-pubertal period is the time of greatest vulnerability to flare-ups of healed tuberculous infections. The development of the adult form of tuberculosis from the seemingly healed childhood form can be precipitated by nitrogen losses due to many causes, the predisposing factor being the tendency to a negative balance, which is part of the phenomena of puberty itself. The problem posed by the tubercular adolescent would seem to be the need for supplying amounts of foods adequate for normal growth and for the healing process and of an understanding of the mechanism of and the offsetting of the diminished ability to retain nitrogen in the post-menarcheal period.

We found an adequate diet for such patients to be one which provided a caloric intake of basal plus 70 per cent, derived 15 per cent from protein, 35 per cent from fat, and 50 per cent from carbohydrate. With such an intake, for most patients at bed rest, whose process was not far advanced, good storage resulted. It was not adequate for some advanced cases, and it was necessary to increase intake without raising volume by adding amino acids or powdered milk. This was also necessary when anorexia prevented an intake of the desired quantity. It was not possible to leave this to the chance of the child's selection, which tended to result in less protein and more carbohydrate or fat.—*Joseph A. Johnston, M. D., Pediatrician-in-Chief, Henry Ford Hospital, Detroit, speaking before the 39th Annual Meeting of The American Dietetic Association in Milwaukee, on October 10, 1956.*

Nutrition in Tuberculosis

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THIS REPORT presents data from a group of tuberculous patients consecutively admitted to the hospital in which adaptation to the hospital dietary was specifically investigated. In previous papers (1-3) our main concern was with interrelationships of components of the diet and factors influencing food intake or utilization, such as alcoholism or medications. Since the studies were on groups already established in the hospital or on these patients prior to admission, the effects of transplanting from one environment to the other could not be evaluated. The methods of analysis applied here are similar to those used previously, except that we have used ranking methods to show changes in the pattern of food acceptance.

Methods

All adult patients admitted over a four-month period to the University of California Tuberculosis Service at the San Francisco City and County Hospital were studied. On admission, an estimate was made of the mean daily food intake for the previous two to six weeks. Care was taken to obtain as exact a report from the patient as possible. This was done by personal interview and checked against the patient's expenditures for food. Daily dietary records of the actual intake in the hospital were started after the first day of admission. Food values were calculated (4, 5) and averaged for each week's intake. These records were maintained for three months or until departure from the hospital.

Data on clinical and social history were obtained for correlation with food intake. The criteria for underweight were determined by reference to ideal height-weight tables (6), and weight gain or loss was regarded as real only if the difference were 2½ per cent or more of the original weight.

During the four-month period, 78 men and 19 women were admitted. Of the men, 4 were transferred away from the hospital in less than one week; 7 entered critically ill—only one of whom could be included in the series; 4 spoke only Chinese; and 6 were incoherent or proved to be unreliable. Thus the study group was reduced to 58 men. Of the 19 women, one proved to be unreliable; all others were included. Forty-four men remained for a period of four weeks or longer. In contrast, all of the women remained through the first four weeks of the study.

The populations then consisted of:

(a) Fifty-eight men staying one week or more.
(b) Forty-four men staying four weeks or more.
(c) Eighteen women staying four weeks or more.

Analysis of Caloric Intake

Our previous papers have shown that the percentage of protein calories consumed was relatively constant. The relationship of intake to need is amplified by expressing caloric intake in terms of basal caloric requirement, using the DuBois formula (7) for calculating surface area corrected for sex and age.

Table 1 summarizes the mean protein intake both as a percentage of total caloric intake and as a percentage of basal caloric requirement. The pre-admission mean intake was significantly lower than the post-admission mean intake. On the other hand, the mean intake during hospitalization was practically constant from week to week despite the wide variation in actual food acceptance.

The problems of individual consistency of food intake in the hospital and also the transition from pre-admission to in-patient status were evaluated using Spearman's rank correlation coefficient R and the coefficient of correlation (r). The results are summarized in Table 2. Protein intake expressed as percentage of basal caloric requirement was highly correlated in the men between Weeks 1, 2, and 4, less well but still well correlated for the women in the same period, but significantly less well correlated for both sexes in the pre- and post-admission comparison. Using total calories in this

[1]This investigation was supported by a research grant from E. R. Squibb and Sons, New York City. Received for publication March 15, 1957.

TABLE 1 **Analysis of caloric intake in the hospital**

PERIOD	MEN					WOMEN		
	Total group			Studied for four weeks				
	Number of subjects	Protein calories as mean per cent of total caloric intake	Protein calories as mean per cent of basal caloric requirement	Protein calories as mean per cent of total caloric intake	Protein calories as mean per cent of basal caloric requirement	Number of subjects	Protein calories as mean per cent of total caloric intake	Protein calories as mean per cent of basal caloric requirement
Pre-admission	58	....	17.69 ±8.0	....	....	18	....	15.778±6.5
Week 1	58	16.0 ±1.08	28.21 ±6.08	15.886±1.049	28.14 ±5.47	18	....	....
Week 2	49	15.848±1.058	28.949±6.27	15.886±1.091	28.563±6.31	18	14.666±1.42	25.667±7.98
Week 3	47	16.18 ±0.948	30.138±8.883	16.227±0.962	29.888±9.127	18	....	....
Week 4	44	....	....	16.096±1.068	29.49 ±6.09	18	15.778±6.5	28.49 ±8.11

context of percentage of basal caloric requirement, there was a slightly less good in-patient correlation of rank, but still highly significant.

The interpretation of these figures leads one to predict that the patients who initially accept food well will continue to do so, and those who do not, will maintain their rank order of intake over a month. Furthermore, the mean protein intakes were very constant. However, it is clear that factors must enter in to disturb this constancy when the patient is living outside of the hospital.

Caloric Intake and Clinical Factors

In our previous papers we noted that, in order to gain weight, alcoholics appeared to require a higher total caloric intake as a percentage of their basal caloric requirement than the rest of the population. It was also observed that male patients taking para-aminosalicylic acid (PAS) tended to eat more than the rest of the populace. Table 3 shows similar findings in this early hospitalized group and further substantiates this view. In addition, it indicates again that there is a real trend for the underweight patient who gained in the hospital to select a higher caloric intake expressed as percentage of basal caloric requirement. It is interesting to note that admission for tuberculosis in only twelve men was for a febrile disturbance, and of these, fever persisted in three. The majority were admitted with either spread of their disease, persistently positive sputum, or early cases with relatively asymptomatic lesions.

Socio-Economic Factors

We have already established that there is some correlation between the pre- and post-admission protein intake expressed as percentage of basal caloric requirement. For both sexes there was a very high association between the pre- and post-admission intakes when split at 25 per cent of basal caloric requirement as protein calories. Yet the mean pre-admission intake was considerably below that for in-patients, as seen in Table 1. This is explained by the fact that pre-admission intakes below the 25 per cent level were further below than those of subjects while in-patients. This suggests that patterns of greater or lesser protein intake are not completely dependent on external factors operating

TABLE 2 **Consistency of protein intake**

PERIODS COMPARED	SUBJECTS	SEX	FACTOR	R	t	SIGNIFICANCE	r	z	SIGNIFICANCE OF DIFFERENCE
Week 1 and pre-admission	58	M	%BCR/P	.3318±.1325	2.63	*	.324	.335±.135	
Week 4 and pre-admission	44	M	%BCR/P	.3542±.1527	2.453	*	.326	.335±.156	
Week 2 and Week 4	44	M	%BCR/P	.851 ±.1527	10.5	***	.8597	1.288±.157	**
Week 4 and pre-admission	18	F	%BCR/P	.132 ±.242	0.532		.2226	.225±.258	
Week 2 and 4	18	F	%BCR/P	.5533±.242	2.65	*	.5879	.674±.258	
Week 1 and Week 4	44	M	%BCR/T	.625 ±.1527	6.3	***			
Week 2 and Week 4	18	F	%BCR/T	.6172±.242	3.135	**			

R = Spearman's rank correlation coefficient
t = Student's t test for significance
r = coefficient of correlation
z = Fisher's z transformation
%BCR = percentage of basal caloric requirement
P = protein caloric intake
T = total caloric intake
*** = extremely significant, $P \leq 0.001$
** = highly significant, $P \leq 0.01$
* = significant, $P \leq 0.05$

TABLE 3 **Caloric intake of men in relation to clinical factors**

SUBJECTS	ASSOCIATION OF FACTORS AND THEIR CONVERSES	χ^2	SIGNIFICANCE	Q
44	PAS therapy: mean 28-day caloric intake of 179%BCR/T and more	15.25	***	
41	non-febrile: weight gain and mean 4-week caloric intake of 186%BCR/T and more	12.56	***	
41	non-febrile: weight gain and mean 4-week caloric intake of 172%BCR/T and more	17.09	***	
26	gainers: alcoholic and mean 4-week caloric intake of 186%BCR/T and more		**	.772±.195
26	gainers: alcoholic and mean 4-week caloric intake of 172%BCR/T and more			.181±.527
26	gainers: underweight and mean 4-week caloric intake of 186%BCR/T and more		**	.714±.232
24	underweight: weight gain and mean 4-week caloric intake of 186%BCR/T and		***	.920±.078
24	more alcoholics, nonfebrile: weight gain and mean 4-week caloric intake of 186%BCR/T and more		***	.962±.058

χ^2 = the χ^2 distribution test of association; Yates correction has been applied in each case
Q = Yule's coefficient of association
*** = extremely significant, $P \leq 0.001$
** = highly significant, $P \leq 0.01$
* = significant, $P \leq 0.05$

at particular times. A subject in the lower group of protein intake before hospitalization will still tend to fall into the lower group of protein intake as an in-patient, although the actual intake may increase.

Pursuing this further, some associations between protein intake as percentage of basal caloric needs and socio-economic factors are presented in Table 4. These show the association mentioned before. In addition, the associations of low income (below $68 monthly) both with protein intake below 17 per cent of basal caloric requirement and with alcoholism are seen to be significant. However, underweight was not significantly associated with either alcoholism or low income. This can be explained in part, at least, by the fact that much of the low-income group was alcoholic and the caloric value of alcohol is high. The size of the group did not permit the elimination of the alcoholic population; however, in our previous communication this was found to be non-significant, and the addition of this group still does not show an association. In those patients with multiple admissions, a history on previous admissions of leaving without medical advice (AWOL) did not show an association with being underweight. In the male group eventually going AWOL within one year of admission, the combination of alcoholism and low income was significant. Lastly, it is interesting that in the male group, excluding deaths, there was a significant association between a lower acceptance of the hospital diet and eventual AWOL. This association of low income and low pre-admission protein intake may serve as a possible indication that a patient may go AWOL.

Protein Intake

The pre-admission population does not lend itself to accurate calculation of total calories because of the variable fat and carbohydrate component due to cooking methods and the use of gravies and sauces, as well as the alcohol intake. Also, since cooking methods, storage, season, and maturity affect the vitamin content of foods, it was not felt justifiable to estimate these. However, protein intake is much more amenable to study since these three factors do not significantly affect it. For this

TABLE 4 **Relationship of socio-conomic factors and nutrition**

SUBJECTS	SEX	ASSOCIATION OF FACTORS AND THEIR CONVERSES	χ^2	SIGNIFICANCE	Q
58	M	Week 1 intake 25%BCR/P and more vs. pre-admission intake	43.265	***	
44	M	Week 4 intake 25%BCR/P and more vs. pre-admission intake	40.90	***	
18	F	Week 4 intake 25%BCR/P and more vs. pre-admission intake	16.45	***	
58	M	pre-admission intake: low income and intake of 17%BCR/P and less	13.304	***	
34	M	pre-admission alcoholic; low income and intake of 17%BCR/P and less	6.734	**	
58	M	pre-admission intake: alcoholic and underweight	0.202		
58	M	pre-admission intake: low income and underweight	1.95		
58	M	Week 1: eventual AWOL and intake of 178%BCR/T and less	3.38		
54	M	Week 1: excluding deaths; eventual AWOL and intake of 178%BCR/T and less	4.47	*	
42	M	multiple admissions: history of AWOL and underweight		*	0 ±.31
21	M	eventual AWOL: alcoholic and low income		-	0.6±.326

***extremely significant, $P \leq 0.001$
**highly significant, $P \leq 0.01$
*significant, $P \leq 0.05$

TABLE 5 **Mean daily intake of specific food groups**

FOOD GROUP	PRE-ADMISSION INTAKE	POST-ADMISSION INTAKE	††	F‡
		Men—Week 1		
	gm./day	*gm./day*		
Milk and milk products	15.344±14.90	46.37 ±16.43	108.6***	1.355*
Eggs	10.983± 4.42	11.948± 2.97	0.93	2.21**
Meat, fish, and fowl	18.84 ± 8.39	19.31 ± 6.07	3.45**	1.89*
Cereals, bread	12.36 ± 4.52	10.51 ± 2.89	26.1***	2.37**
"Good" protein#	44.9 ±26.90	77.8 ±25.47	67.4***	1.114*
%BCR/GP¶	11.75 ± 8.0	20.50 ± 7.74	59.9***	1.068*
		Women—Weeks 2 and 4		
Milk and milk products	14.0 ±22.8	34.06 ±11.72	1.45	3.8**
Eggs	5.12 ± 9.17	9.12 ± 4.45	1.62	4.25**
Meat, fish, and fowl	16.055±17.55	17.06 ± 6.6	0.199	7.07**
Cereals, bread	6.84 ± 5.03	8.66 ± 3.25	1.25	2.36*
"Good" protein	35.67 ±13.9	59.0 ±13.22	5.3***	1.105
%BCR/GP	11.22 ± 4.99	18.0 ± 5.83	3.61**	1.36

†t = Student's t test for significance
‡F = Snedecor's F variance ratio test of difference between standard deviations
#"Good" protein includes milk and milk products; eggs; and meat, fish, and fowl.
¶BCR = per cent of basal caloric requirement; GP = good protein
***extremely significant, $P \leq 0.001$
**highly significant, $P \leq 0.01$
*significant, $P \leq 0.05$

reason, the pre-admission intakes are discussed only in terms of protein intake.

In Table 5, the mean pre-admission and post-admission protein intakes are summarized. Increased consumption of milk and milk products in the hospital was most significant. Actually, 53 of 58 men increased their consumption by a mean increment of more than 4 cups per day. Four patients decreased their milk intake by less than 1 cup per day; all of these were above a 3½-cup-per-day level on the outside. Only one patient consuming the equivalent of 2 cups a day prior to hospitalization reduced his intake to 1 cup. Three factors appeared to be implicated: good tolerance of fluid milk; encouragement by the staff; and belief that milk drinking would help the disease.

On the other hand, it can be seen that alteration in the eating of eggs was not great. Forty-five of the men ate two eggs a day outside the hospital, ten less, and three more. Seven of the ten eating less than two eggs increased their egg intake in the hospital, and two of the three eating more than two eggs decreased egg consumption by one egg or more. Only one of the forty-five eating two eggs altered his intake by as much as one egg. Thus, two eggs a day seem to be the desire of the majority of these patients. Also, eggs are relatively cheap.

As with eggs, little change was apparent in the mean intake of meat, fish, and fowl or cereal protein. However, Table 6 shows that pre-admission intakes above the mean of meat, fish, and fowl did not continue in the hospital. The pre-admission intake of cereal protein by the men showed a significant decrease after hospitalization. Thus milk *per se* accounted for the very considerable rise in "good" protein intake of in-patients. It is apparent that although milk is a somewhat less expensive source of protein than eggs, it was not fully utilized before admission, perhaps due to restaurant eating. Also, there was little switch from cereals to meat, fish, and fowl, despite the expense factors.

In Table 6 we have used actual mean caloric intake from protein which was highly associated with percentage of basal caloric requirement provided by protein calories. This was done since it correlated better with the general understanding of those in the field dealing with problems of practical nutrition. Although the mean protein intake from cereals altered little, actually the association of decrease in intake with the higher pre-admission intakes was highly significant. Therefore, in some patients a readjustment away from cereals did in fact occur. Those subjects whose pre-admission intake was above the mean for milk or meat, fish, and fowl were highly associated with those above the mean intake of "good" protein. However, this was not so with eggs and even less so with cereals. Milk and meat, fish, and fowl intakes were unrelated to each other. Below-average intakes of meat, fish, and fowl and of total "good" protein were neither one associated with low income.

Forty-five per cent of the men ate in restaurants, but all of the women ate their meals at home. Except for a possible trend for people eating at home to

TABLE 6 **Pattern of food selection for fifty-eight men**

ASSOCIATION OF FACTORS AND THEIR CONVERSES	χ^2	SIGNIFICANCE
Pre-admission intake: above-mean "good" protein intake and above-mean %BCR/GP	33.7	***
Pre-admission intake: above-mean milk intake and above-mean "good" protein intake	20.18	***
Pre-admission intake: above-mean meat, fish, and fowl intake and above-mean "good" protein intake	11.5	***
Pre-admission intake: above-mean egg intake and above-mean "good" protein intake	3.256	
Pre-admission intake: above-mean meat, fish, and fowl intake and above-mean cereal intake	0.064	
Pre-admission intake: above-mean milk intake and above-mean meat, fish, and fowl intake	0.558	
Pre-admission intake: below-mean "good" protein intake and low income	0.548	
Pre-admission intake: below-mean meat, fish, and fowl intake and low income	1.118	
Pre-admission above-mean cereal intake decreased in hospital, but below-mean did not decrease	12.25	***
Pre-admission above-mean meat, fish, and fowl intake and in-patient above-mean meat, fish, and fowl intake	0.012	
Week 1: above-mean "good" protein and above-mean %BCR/GP	19.45	***

***extremely significant, $P \leq 0.001$

drink more milk and eat more meat, fish, and fowl, restaurant- and home-eating showed no additional relationships other than reported on previously (1).

These facts require a readjustment of some general ideas about the evaluation of nutrition of patients prior to hospitalization. Intakes of milk or meat, fish, and fowl are clearly far better guides to level of protein intake than either egg consumption or income. At present, egg intake is stable and appears to be at a fairly high level in most cases.

Again, in Table 5 it is clear that in the first week of admission, less variation in diet occurred than in the pre-admission phase. This points to the effect of hospital food service in these patients with tuberculosis. Despite a widely varying individual food acceptance, hospitalization brought about a more predictable and higher nutritive intake than patients had outside the hospital. This would suggest that some form of communal feeding arrangements on the outside could be advantageous. It is also interesting that variation of "good" protein intake was considerably less in the women than in men, although there was no significant difference in percentage of basal caloric requirement as "good" protein calories on the outside.

Summary

The pre- and post-admission dietary intakes of fifty-eight men and eighteen women admitted to the University of California Tuberculosis Service at San Francisco City and County Hospital were studied. The mean caloric intake of protein was lower for these subjects prior to hospitalization than after. While they were hospitalized, food intake showed a high degree of constancy through the first four weeks. Less constancy was apparent between the pre-admission and in-patient phases.

It was reconfirmed that alcoholics require more calories to gain weight than others, and that patients receiving para-aminosalicylic acid (PAS) consume more food.

Pre-admission protein intake above 25 per cent of the basal caloric requirement was associated with the same intake when the subjects were hospitalized. Low-protein pre-admission intake of the subjects was associated with low-protein intake during hospitalization, although the actual intake was increased. Low income was associated with low-protein intake but not with underweight prior to hospitalization. Eventual discharge against medical advice (AWOL) was associated with alcoholism, low income, low pre-admission protein intake, and lower-than-the-mean acceptance of the hospital diet.

The major rise in protein intake in the hospital was in milk. Intake of cereal protein fell off somewhat. Eggs and meat, fish, and fowl as protein sources changed but little. In the pre-admission period, either high milk or meat, fish, and fowl, but not both, was associated with high intake of "good" protein, whereas eggs and adequate income were not associated.

Pre- and post-admission intakes of the women varied less than those of the men.

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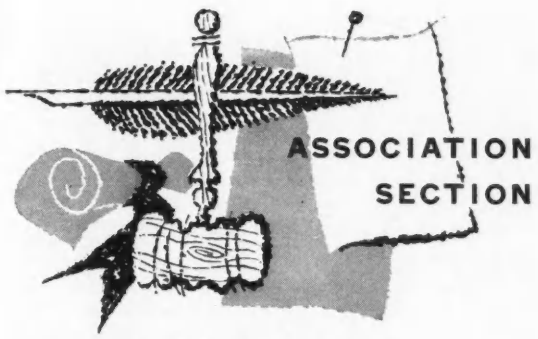


Anna Boller Beach Receives Copher Award for 1957

ANNA BOLLER BEACH has been named the recipient of the Marjorie Hulsizer Copher Award for 1957, the highest award of The American Dietetic Association. The Copher Award is an honor bestowed each year on a distinguished member of the dietetic profession at the Annual Banquet of the Association. This year, presentation of the Award was made by Dr. Frank R. Bradley, Director, Barnes Hospital, St. Louis, on October 24 in Miami Beach, who said:

"In presenting the highest award of The American Dietetic Association to Anna Boller Beach, you do honor to your Association. What she and the founders of your organization did and the way they brought The American Dietetic Association into being is a story full of meaning for us today, for it brings a realization of the refuge and strength the past can be, to us in the troubled present. When we consider the masterful individuals who created your organization, we are brought—yes, forced—to fresh appraisals of our own intellectual activities. The need for outstanding individuals is one of our major problems. Dietetics, particularly in the hospital and in industry, requires group effort to perform its complex functions, but it needs individual accomplishment more than ever before.

"We know that Marjorie Copher would enthusiastically concur in honoring Mrs. Beach. On October 16, 1925, when Marjorie was Chairman of the Resolutions Committee, she signed a resolution that The American Dietetic Association was greatly indebted to Anna E. Boller, then your Executive Secretary, for her cheerful, unflagging zeal. She didn't elaborate, but as Al Smith said, 'Let us look at the record.' An editorial in the June, 1927 issue of the JOURNAL OF THE AMERICAN DIETETIC ASSOCIATION does just this.[1]

> On the first of March the Association lost its executive secretary, Anna E. Boller. But in losing our executive secretary we were fortunate enough to keep Miss Boller; no longer under contract to give us a part of her time, she continues to make us a present of the rest of it, managing the commercial exhibits with her accustomed ability and success. I dare say that her mother is still giving us most of her spare time as she has done for years. When the A. D. A. could not afford to pay office rent, the Boller family gave us their sitting room for an executive office. When they came to our annual meetings and found out just which things promised by the hotel people and the local members and all the rest of us had not been done, Ann did them, working late, before, during, and after the meetings; her mother, with perfect equanimity, endured broken nights and lights in her bedroom at all hours and helped us out with her experienced judgment on numerous difficulties.
>
> Legion are the friends throughout the country she has made for the Association among commercial food and equipment companies. They like to do business with her, they trust her straightforwardness and they assume that the organization she represented will have the same qualities.
>
> It was Miss Boller who made for us our first investment, which tided us over many lean seasons. It was she who put our affairs on a really business-like basis. We ought to dig out and print some of her annual reports, and study them; she read them so modestly that few of us realized the steady advance they indicated. She bore our occasional wondering why she did not do the work of four women instead of the work of only three; she endured our lethargic support when she should have had our vigorous help; without any waving of flags or blowing of trumpets, she pushed and pulled until we were much further along our chosen way than we could ever have come without her.
>
> And now she resigns, that is, she gives up her small salary as secretary, but goes on with the hardest part of her work. We wish her all possible happiness and success in her new work, and we hope that she may long continue to show us, with cheerful faithfulness, with never-failing enthusiasm, with utter lack of self-seeking, how a professional society should be served by its members.

"Anything that I could say further would be anticlimactic. You are all better acquainted with her in her terms of office as President and in many other essential positions which she has held with your organization, and I can only repeat that in honoring Anna Boller Beach, you do honor to your Association.

"Anna Boller Beach, outstanding dietitian and beloved leader in your profession, you rank high among those who fostered, developed and advanced The American Dietetic Association. Your career is a source of inspiration for those who may wonder if the long road in dietetics and organization work is worth following. It is with great and sincere pleasure that we welcome you to the ranks of those distinguished members of your profession who have received the Marjorie Hulsizer Copher Award for your distinguished service in the field of dietetics."

The Marjorie Hulsizer Copher Award which Mrs. Beach received reads:

[1] Anna E. Boller. Editorial. J. Am. Dietet. A. 3: 35, 1927.

". . . PIONEER IN THE AMERICAN DIETETIC ASSOCIATION: ITS FIRST EXECUTIVE SECRETARY, SIXTH PRESIDENT, DILIGENT AND FAITHFUL COLLECTOR AND COLLATOR OF ITS HISTORICAL PAPERS AND MEMENTOS, PARTICIPANT PRE-EMINENT FOR ATTENDANCE AND ACTIVITIES IN MANY CAPACITIES AT ANNUAL MEETINGS FOR NEARLY FOUR DECADES . . . IN RECOGNITION ALSO OF HER INTEGRITY; OF HER ABIDING FAITH IN, AND UNFAILING LOYALTY TO THE PRINCIPLES OF HER PROFESSION; OF HER NOTEWORTHY ATTAINMENTS IN THE FIELD OF APPLIED NUTRITION IN THE HOSPITAL CLINIC AND EDUCATION IN INDUSTRY."

In accepting the award from Lucille M. Refshauge, Association President, Mrs. Beach said:

"Thank you. I accept this award with deep humility, for I know few people make their contributions unassisted. Any accomplishments credited to me would not have been possible without the help and inspiration of many of you here tonight. This is my opportunity to thank you and to share this honor with all who have so generously cooperated with me throughout the years.

"I thought it might be fitting to name those of you who have shared the work with me on various teams: the Executive Committee (as it was called in my day), other committees, boards, and so on. My list grew and grew until I was forced to abandon the idea. Instead, may I tell you why I have always considered it a privilege and found it a pleasure to have had some small part in the making of our Association's history?

"Working on the material accumulated for the history of The American Dietetic Association has been like going through a memory book. It has recalled to my mind the many wonderful women who have made our organization what it is today, as well as the pleasant, sometimes amusing, and at times 'critical' situations. If time permitted, I know you would be amused at some of these, especially at what was considered 'critical.'

"Great women, possessed of the wisdom defined by Coleridge as 'common-sense in an uncommon degree', have served our Association with infinite ability and vision. To have known these leaders, to have worked with them, and to have had their guidance, as Shakespeare has said 'in my salad days—when I was green in judgment,' has been a rare privilege and a pleasure.

"I should like to pay tribute to all who fall into the above category of great women in the Association, but the list is too long. I shall, therefore, comment on only a few.

"First, of course, would be Marjorie Hulsizer Copher, in whose memory this Award is given each year to immortalize her short but distinguished career in World War I and in civilian life. We cannot too often recite her many contributions to our Association and to our profession. They have been a constant inspiration to all of us. She, as you know, was one of the first dietitians to go overseas, assigned to the British Army. For her valuable services, she was decorated by King George V of Britain and by the government of France. Her work with the American Army, to which she transferred, was equally outstanding.

"Some years ago, in an unsigned editorial, Mary Huddleson paid this tribute to her[2]: 'To all who knew her, Marjorie Copher endeared herself. Courage, loyalty and ability, along with simple unaffectedness and charm of manner, were her distinguishing characteristics.' More recently Mrs. Huddelson said[3] this of her, 'She was beautiful, had great dignity and was a charming hostess.'

"In 1945 in presenting the first Copher Award to Lieutenant Ruby Motley for her courageous work at Bataan and Corregidor, Maniza Moore, then our President, told of her impression of our Tenth Annual Meeting in St. Louis. She said, 'Her [Mrs. Copher's] efficiency contributed much to the smooth functioning of the program and her charm and sincerity made each of us her personal guest."[4] Having worked with Mrs. Copher, I concur with everything that has been said of her.

"Many others, like Mrs. Copher, have given unstintingly of their time and energy. At a recent History of The American Dietetic Association Breakfast, Mary deGarmo Bryan spoke of them as 'the giants from whose shoulders we have been able to see farther.'

"For example, Lulu Graves and Lenna Cooper, the co-founders of our Association, are two whose work throughout the years has contributed so much to the development of our profession. Our second President, Mary deGarmo Bryan, guided our organization with skill and diplomacy through two of its uncertain early years. It was during Octavia Hall Smillie's administration that the Association was incorporated, the central office established, and our first regular bulletin (the forerunner of the JOURNAL) was published. This was accomplished with a membership of about four hundred paying only $3 annual dues.

"Striving for greater democracy in the Association, Florence Smith first suggested a House of Delegates as a representative body to guide the destiny of the Association. This was an impossibility in 1926 because few state groups had been organized. Her suggestion, however, stimulated the affiliation program, which developed under Martha Koehne and others. By 1935, during Katherine Mitchell Johnson's term as President, the House of

[2]Marjorie Hulsizer Copher—1891-1935. J. Am. Dietet. A. 11: 129, 1935.

[3]Personal communication.

[4]The first Marjorie Hulsizer Copher Memorial Award. J. Am. Dietet. A. 21: 703, 1945.

Delegates became a reality with very limited powers which gradually increased until 1948. At that time Helen Hunscher and her Board started the reorganization project, suggested by Mable MacLachlan the previous year. This was completed in 1949 during Helen Walsh's administration and gave the House of Delegates its present powers and brought about the democratic organization of which Miss Smith dreamed.

"Even the shortest list of outstanding persons would have to include Mary Huddleson, who so capably served as Editor of the JOURNAL for nearly twenty years. She raised an unpretentious quarterly to a monthly publication which not only took its place among leading professional journals, but also helped dietitians immeasurably in becoming recognized members of the 'professional team.'

"Mary Swartz Rose and her inspiring influence has already been mentioned tonight.

"Malcolm T. MacEachern, though not of our profession, is another person to whom I wish to pay tribute. Unquestionably, he could be called the 'dietitians' best friend.' He guided us in much of our early and inexperienced thinking; he carried our message to administrators; he was responsible for including in the standards for hospital approval of the American College of Surgeons the requirement that the dietitian be a member of The American Dietetic Association. Dr. MacEachern was the first to be appointed to our Advisory Board. In this capacity (and also unofficially), he did more to have our profession accepted by hospitals here and abroad, than any other individual.

"Ruth Wheeler is another to whose memory I should like to pay homage. Though physically 'tiny,' she was a woman of great stature. The launching of the JOURNAL at a time when the Association hardly knew how it would meet its financial obligations took great courage, especially with me as its inexperienced manager. Selling anything, including advertising, never has been my forte. With Dr. Wheeler's wise guidance, however, we weathered those first years. You know the influence of the JOURNAL today—what it means to us all.

"Dr. Wheeler also proposed standards for membership far in advance of her time. For many years they were and still are, to some extent, the basis for our membership requirements. A stern, yet kind critic, she was always generous in praise. She was a beloved teacher and a great leader—an inspiration to all. It is not surprising that she has been called the Association's 'Matron Saint.'

"The vision of our leaders has been demonstrated by the fact that many of the seeds they planted took years to germinate because the soil was not ready. Later when the Association was ready, the seeds sprouted and new plants grew. Their forward looking spirit laid a sturdy foundation for our great organization—and it *is* a great organization. Success has not spoiled us, we are still reaching for higher goals and doing this with freedom from hampering influences. Dr. Wheeler often said that she dreaded the time when we would have a treasury which did not have to be stretched to the limit, that when we reached any degree of affluence, she feared that politics might enter our ranks. I know that she would be gratified that the ideals which she and others fostered have grown into strong plants which have, and I trust always will, resist the intrusion of the weeds of personal gain."

Elisabeth S. Yearick Named 1957 Mary Swartz Rose Fellow

THE MARY SWARTZ Rose Fellowship was awarded this year, for the ninth time, at the Annual Banquet of The American Dietetic Association on October 24 in Miami Beach. The recipient of the fellowship, made possible by a grant from the Nutrition Foundation, Inc., is Elisabeth S. Yearick. Presentation of the fellowship was made by Dr. Horace L. Sipple, Eexecutive Secretary of The Nutrition Foundation, Inc. He said:

> Undoubtedly, the Mary Swartz Rose Fellowship Award is well known to all members of The American Dietetic Association. Its presentation has formed a part of the Annual Meeting of your Association for a number of years. The nature and purpose of the Award and the life and work of Mary Swartz Rose, for whom the Award is named, have been well set forth, most recently in the presentations made by Dr. Helen Hunscher in 1956[1] and by Dr. Lydia J. Roberts in 1955.[2]
>
> It occurred to me that on this occasion you might be interested in having a review of the Nutrition Foundation's reason for wishing to sponsor this Award and our comments as to whether the intended purpose is being achieved.
>
> The Nutrition Foundation was formed to provide increased support of basic research and education in the science of nutrition. In the educational work undertaken as part of the Foundation's program, it has seemed best to emphasize activities designed to assist professional personnel, so that they in turn, as educators of the public, can accomplish the task of reaching all segments of the population.
>
> To encourage interest in four of the professional fields most closely related to nutrition and to assist the organizations largely responsible for guiding the development of personnel in these fields toward high levels of achievement, the Foundation has sponsored four annual awards. Each organization is given complete independence with respect to the award. Each award is named in recognition of an individual whose accomplishments have been appropriate to the ideals of the professional group. In addition to the award of your Association, the Foundation sponsors the Osborne and Mendel Award of the American Institute of Nutrition, the Babcock-Hart Award of the Insti-

[1] HUNSCHER, H.: Aimee N. Moore becomes Mary Swartz Rose Fellow. J. Am. Dietet. A. 32: 1185, 1956.

[2] ROBERTS, L. J.: Myrtle L. Brown becomes 1955 Mary Swartz Rose Fellow. J. Am. Dietet. A. 31: 1239, 1955.

tute of Food Technologists, and the Joseph Goldberger Award of the American Medical Association.

The American Dietetic Association accepted the Foundation's offer of an award grant, deciding to use it for a graduate fellowship in foods and nutrition, designated as the Mary Swartz Rose Fellowship Award.

As to the degree of success achieved in this program, we feel that the record speaks for itself. Your Association has administered the Award with great skill and sound judgment, with the result that all recipients have not only met the initial requirement of interest and ability in the field of nutrition, but have subsequently demonstrated their qualifications by making valuable contributions to nutritional science.

I would like to review for you the names of the recipients of the Mary Swartz Rose Fellowship Award and to comment on the modesty displayed by your Association in connection with the handling of the awards program. Although the recipient of the first Award was eminently qualified in all respects, we have noted no tendency on the part of the Association to publicize the event. I believe the reason for this is that the first Award was made to The American Dietetic Association itself. I am pleased to recall for you that the Award, as sent by the Foundation to the President of the Association in 1948, read as follows:

> THIS AWARD FOR OUTSTANDING ACCOMPLISHMENT, TOGETHER WITH A SUM OF $1,000.00 IS PRESENTED TO THE AMERICAN DIETETIC ASSOCIATION: IN RECOGNITION OF THE LEADERSHIP, INSPIRATION AND DILIGENCE OF ITS MEMBERS IN APPLYING AND IN DEVELOPING THE SCIENCE OF NUTRITION IN HOSPITALS, GOVERNMENT SERVICE, FOOD CLINICS, PUBLIC HEALTH AGENCIES, SCHOOL LUNCHROOMS, COLLEGES AND UNIVERSITIES, AND IN INDUSTRIAL ORGANIZATIONS, FOR THE ADVANCEMENT OF HUMAN HEALTH. AND IN FURTHER TRIBUTE TO ITS MEMBERS WHO DURING THE PAST THIRTY YEARS HAVE STEADILY RAISED THE PROFESSIONAL STANDARDS OF DIETITIANS TO THEIR PRESENT HIGH LEVEL OF TRAINING AND SERVICE.

As you know, subsequent awards have been made by the Association in the form of fellowships given to qualified candidates. The recipients have been:

1949 and 1950—Pearl Jackson Aldrich, Iowa State College
1951—Helen F. Barbour, Iowa State College
1952—Mary K. Bloetjes, Cornell University
1953—Margaret L. Ross, Pennsylvania State University
1954—Marjorie McKinley, Iowa State College
1955—Myrtle L. Brown, Pennsylvania State University
1956—Aimee N. Moore, Michigan State University

The recipient of the Award for 1957, Elisabeth S. Yearick, appears to fulfill all qualifications and requirements. Miss Yearick has received her training thus far in Schenley High School, Pittsburgh, the University of Wisconsin where she received her Bachelor of Science degree *cum laude*, and her master's degree. She is now on the faculty of the dietetic internship at the State University of Iowa Hospital where she is working toward her doctorate. I am told that her doctoral thesis will deal with lipid metabolism.

Miss Yearick has had several years of professional experience, her most recent positions having been Teaching and Clinic Dietitian, Assistant Director of Dietetics and Assistant Professor of Dietetics, Duke University, and her present position of Chief Therapeutic Dietitian and Associate Professor of Nutrition, State University of Iowa. Miss Yearick is a member of several honorary and professional fraternities: Sigma Epsilon Sigma, Omicron Nu, and Mortar Board. She is a member of The American Dietetic Association.

First Mead Johnson Awards Presented in Miami Beach

IN MIAMI BEACH on October 24, on the occasion of the Annual Banquet of The American Dietetic Association, the first eight Mead Johnson Awards for Graduate Training in Dietetics were presented by Martha L. Wessner, Supervisor of Dietetic Services, Mead Johnson and Company, Evansville, Indiana. In making the presentation, Miss Wessner said:

> At the Annual Banquet of The American Dietetic Association in 1956, I had the honor of announcing that Mead Johnson & Company had made available an annual grant of $5,000 to The American Dietetic Association to be used for Mead Johnson Awards for Graduate Training in Dietetics of The American Dietetic Association. At the same time, Dr. Helen A. Hunscher, Chairman of the Association's Awards, Scholarship, and Loan Fund Board, announced that the $5,000 would be divided into two funds. One fund of $2,000 would be used annually to provide two awards of $1,000 each for advanced graduate study, and the other fund of $3,000 would be used annually to provide six awards of $500 each for dietetic internships.
>
> Each year the recipients will be chosen by the Awards, Scholarship, and Loan Fund Board of The American Dietetic Association with the entire program being carried out by The American Dietetic Association. Only three stipulations have been placed upon the granting of these fellowships by Mead Johnson & Company:
>
> (a) The recipients must intend to practice in the field of dietetics.
>
> (b) They must appear to possess attributes for success in the practice of dietetics.
>
> (c) They must need funds to help them attain their goal of an adequate education.
>
> Certain basic principles were followed in the development of this program. First, the role of Mead Johnson & Company was clearly limited to that of providing funds and consultation help. Although the company served in an advisory capacity in devising the program, details in every instance were worked out by The American Dietetic Association. This principle tended to make the program more practical and better adapted to the needs of your organization.
>
> Second, the method of choice and the actual determination of the recipients of the awards have been carried out entirely by The American Dietetic Association without pressure or influence from Mead Johnson & Company. Thus, responsibility for choos-

ing or not choosing given individuals has rested squarely where it belongs—with your organization.

Third, recipients of awards are under no obligation, implied or direct, to Mead Johnson & Company. While the awards are primarily for individuals intending to practice in the field of dietetics, individuals are not bound, legally or morally, to so practice if their plans change.

The objective of this program is to make a genuine contribution toward the betterment of professional training in dietetics and to gain institutional good will.

The MEAD JOHNSON AWARDS FOR ADVANCED GRADUATE EDUCATION IN DIETETICS of The American Dietetic Association for 1957 are presented for the first time to:

Jerry Margaret Rivers, who is working toward a master's degree at Texas Technological College, Lubbock

Virginia May Vivian, who is pursuing work leading to a doctorate at the University of Wisconsin

The MEAD JOHNSON AWARDS FOR DIETETIC INTERNS of The American Dietetic Association for 1957 are presented for the first time to:

Elaine Brasher—intern at the State University of Iowa Hospital, Iowa City

Dorothy Jane Brown—intern at Vanderbilt University Hospital, Nashville, Tennessee

Kathryn Joan Harvey—intern at Ohio State University Hospital, Columbus

Joyce C. Larson—intern at Eastman Kodak Company, Rochester, New York

Elvira A. Thomas—intern at the Veterans Administration Center, Los Angeles

Barbara Ann Turner—intern at the University of California, Berkley

Lydia J. Roberts Essay Award Goes to Winifred M. Ayers

Announcement of the winner in the 1956-57 competition for the Lydia J. Roberts Essay Award was made at the Annual Banquet of The American Dietetic Association in Miami Beach on October 24 by Edna Mae McIntosh, Nutritionist, Gerber Products Company, Fremont, Michigan. The winner of this competition receives an honorarium of $500 for an essay on a specified area in the history of nutrition. In making the presentation this year to Winifred M. Ayers, Miss McIntosh said:

"Tonight, our Association recognizes the first winner in a second series of five essay contests in the history of nutrition. I feel that it is, therefore, an appropriate time to pause to look back a little at past awards and forward to the next four.

"It was in 1951 that Gerber Products Company made a grant of $500 a year for five years for the best essays on subjects in the history of nutrition. The late Dr. Lillian Storms Coover, my predecessor at Gerber's and our Association's beloved past-president, deserves the credit for Gerber's decision to make the grant. Its being earmarked for research in the area of the history of nutrition was, I am sure, in part influenced by Dr. Coover's close friendship with that small, brave nucleus of members who have sparked our Association's first efforts in the history of nutrition.

"Administration of the Lydia J. Roberts Essay Award has, from the beginning, been in the hands of the Association's Committee on the History of Nutrition and Dietetics. Their decision to honor Dr. Lydia J. Roberts through the name of the award is but one of the many examples of the wisdom and far-sightedness which have characterized that administration.

"In 1952, *Felisa J. Bracken*, Home Economist for the Department of Public Welfare, Baltimore, won the first Award for her essay entitled 'Infant Feeding in the American Colonies.'[1] The 1953 essay on 'Child Feeding in the United States in the Nineteenth Century'[2] was won by *Dorothy L. Jefferson* of Palisades Park, California, full-time homemaker, but former Head of Home Economics at the University of British Columbia. *Alice L. Wood*, a doctoral student at Columbia University and free-lance writer in nutrition, won the 1954 Award. Her subject was 'The History of Artificial Feeding of Infants.'[3] In 1955, the Award went to *Geraldine G. Gardiner*, Associate Secretary, Health and Hospital Division, Social Planning Council, St. Louis County, Missouri. 'Nineteenth Century Leaders in Infant Feeding'[4] was her title. *Dr. Floy Eugenia Whitehead*, Chairman, Department of Home Economics, State University of Iowa, Iowa City, won the Award in 1956. Her subject was 'Nutrition Education for Children in the U.S. Since 1900.'[5] This completed the first series of five awards and marked Gerber's renewal of the grant for a second five years. May these be an incentive for even greater participation in future contests.

"Titles for the second series follow:

1957—Changing Attitudes Toward Overweight and Reducing
1958—The Development of the Use of Vegetables in Infant Feeding
1959—The History of Dietary Use of Liver
1960—Changes in Beliefs and Food Practices in Pregnancy
1961—World Problems in Infant Care

May these be an incentive for even greater participation in future contests.

"The Award winner this year—Winifred M. Ayers—was born in Aberdeen, South Dakota. She graduated from Franklin High School, Portland, Oregon, and received a Bachelor of Arts degree in history and social sciences from Reed College, Portland. She later studied at the School of Domestic Arts and Sciences, Chicago, for one year. She is a

[1] J. Am. Dietet. A. 20: 349, 1953.
[2] J. Am. Dietet. A. 30: 335, 1954.
[3] J. Am. Dietet. A. 31: 474, 1955.
[4] J. Am. Dietet. A. 32: 435, 1956.
[5] J. Am. Dietet. A. 33: 880, 885, 1957.

January 1958 candidate for the degree of Master of Science in nutrition and home economics at Illinois Institute of Technology, Chicago.

Our recipient has been a graduate assistant in history at Reed College. She was Assistant Manager of the cafeteria at Billings Hospital, Chicago, and a food service manager and supervisor with Harding-Williams, industrial caterers in Chicago. She has been a research assistant with the Council on Foods and Nutrition of the American Medical Association. She is currently Nutritionist, Morton Clinic, Presbyterian-St. Luke's Hospital, Chicago, and an applicant for membership in The American Dietetic Association.

"My private detectives tell me that the Miss Ayres cooks excellent barbecue ribs and lamb shanks and is an expert pickle maker. She's a 'bug' about new cars and likes to fish. Her pet cat, Cedric, turned out to be a lady."

Heinz to Sponsor Recruiting Film on Dietetics and Scholarship

We do not believe that it is an understatement when we say that almost all dietitians are aware of the acute shortage in our field and the tremendous recruiting problem which faces us if our profession is to continue to progress. With this situation in mind, Lucille M. Refshauge, President of The American Dietetic Association, introduced at the Annual Banquet of the Association in Miami Beach on October 24, a representative of the H. J. Heinz Company—B. D. Graham, Vice-President of Marketing—who made the following announcement address to the members.

"There is nothing like an audience dedicated to the cause of better nutrition to make a *Heinz* man feel entirely at home. Over the years, H. J. Heinz Company has *also* been dedicated to better nutrition, and we are very proud of our contribution to the nutritional progress that is being made, both through the efforts of your profession and through the efforts of enlightened food processors of today.

"In the early days of our business when not too much was known about vitamins and minerals, H. J. Heinz, the founder of our company, placed the stress on quality of ingredients, cleanliness of plant, and uniform excellence of our products. He personally was an aggressive advocate and crusader for the Federal Pure Food and Drug Law and a staunch supporter of the great Dr. Harvey Wiley, who played such an important role in the fight for its passage. Today, those early precepts still form the guiding principles of our company—but to them was added some years ago the over-all *additional objective* of better nutrition.

"Speaking before the 46th annual meeting of the Grocery Manufacturers of America, H. J. Heinz, II, President of our company and grandson of the founder, recently said. 'It is the responsibility of the food industry to concentrate more of its effort on providing foods of greater nutritive value . . . I can think of no more inspired or fitting means of discharging our true social responsibility to the American people . . .'

"And, as an indication of the attitude of the H. J. Heinz Company toward this responsibility, I am happy to be able to tell you that more than thirty-six years ago we established the Heinz Nutrition Research Fellowship at Mellon Institute in Pittsburgh for the express purpose of supplementing the nutritional work regularly a part of our Research and Quality Control Department. It is through this fellowship that we have annually published for the past twenty-one years our widely known scientific publication, *Nutritional Data.* This 160-page compilation of the latest available nutritional information on foods is, we are proud to say, a standard reference book in most of the medical schools in the country and in the offices of thousands of physicians, dietitians, and nursing schools.

"Our other activities of this nature have also been numerous. During the past year we made available to schools, hospitals, and clinics an educational film strip on infant feeding. We issue consumer booklets, such as 'Facts on Foods' and 'A Guide to Better Nutrition,' and in recent months we have published a new booklet edited by competent nutrition and medical authorities, "The ABC's of prenatal Care."

"Our Home Economics Department, which we look upon as the liaison between the Heinz kitchens and the consumer's kitchen, is headed by a dietitian—a member of seventeen years' standing in your organization—Lila Jones. Our Food Service Center, whose job it is to develop recipes and menu ideas for restaurants, schools, and hospitals, is headed by Helen Albert, another A.D.A. member.

"After March 1, 1958, when you visit the Pittsburgh home of the '57 Varieties'—and you are all cordially invited to do so—we will be happy to show you through our new, $5-million Research and Quality Control Center now nearing completion.

"These facts are presented to you, not for the purpose of extolling what we are doing, but to establish with you our interest in this field. And *that* brings me to the purpose of my appearance on your program. It was perhaps because of some of these activities of H. J. Heinz Company which I have attempted to sketch for you and because of the identity that we as a company have established in the crusade for better nutrition that some weeks ago we were approached with a very unusual proposition.

"Dr. Hilda H. Kroeger, Administrator of the Elizabeth Steel Magee Hospital in Pittsburgh, speaking officially for the American Hospital Asso-

ciation, told us that the hospital people and The American Dietetic Association were becoming gravely concerned about the acute shortage of qualified dietitians entering the hospital field and that she would like to arrange a meeting between officers of your Association and our company to discuss this problem.

"In the meeting so arranged, your President, Lucille M. Refshauge, and your Treasurer, Dr. Doris Johnson, outlined the need for a professional motion picture to emphasize the important role of the hospital dietitian—a film that could be shown to students, club groups, dietitians, even for public consumption on television—setting forth the opportunities for service in this important field.

"The case for the film was well presented and the proposal was that we contribute toward the cost of preparing such a film. Now we at Heinz did not need to be sold on how vital to the nation's health is the work of qualified dietitians. I must, however, confess that we were not aware of the basic shortage of qualified personnel confronting your group. They pointed out that three out of five hospitals in the United States in all categories, had, at last estimate, no qualified dietitian. Also, there has been a decline for the past six years in the number of interns entering the over-all dietetic field.

"Our deliberation was none too lengthy, therefore, and I am here to tell you what our decision was: we do *not* wish to *contribute*, as your President suggested, toward the cost of such a film—but we would be highly *honored* to pay the *entire* bill.

"It is also my pleasure to report to you about a dinner with your Board here in Miami to discuss the problem again. Following that meeting, I talked by telephone with our President, H. J. Heinz, II. After a brief discussion, he authorized me to put a little frosting on the cake. It is my privilege to add to this announcement by telling you that H. J. Heinz Company will, for the next several years, offer a $1000 scholarship in dietetics. The details of this award will necessarily have to be worked out later and will appear in your JOURNAL, when final.

"I am glad to say that your Association has agreed on our sponsorship of the film on the basis we proposed. You will set up a committee to work closely with the script writers and film producer so that the finished product will reflect the highest professional standards in the dietetic field. It is hoped that this film will perform a service for the dietetic profession and for your Association—and that H. J. Heinz Company is making an indirect but substantial contribution to help you solve your problem."

Bessie Brooks West Resigns from A.D.A. Staff

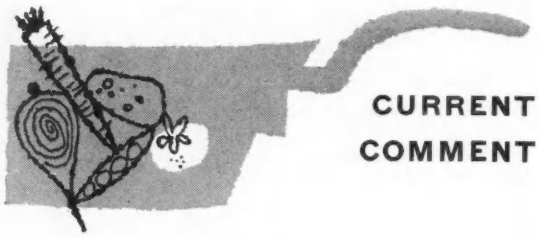
It is with genuine regret that the Association will figuratively wave a bon voyage to Bessie Brooks West this month as she leaves us, first to enjoy the Christmas holidays with her son in Panama, after a stop-over in Guatemala, and then to return to her campus life at Kansas State College, Manhattan, as Professor of Institutional Management.

In January of this year, Mrs. West joined the A.D.A. staff to pioneer the new position of Continuing Educational Services Director during her year's leave of absence at Kansas State College. In the ensuing months, she has not only provided services of great value in meeting with members and helping to plan an institute for the members of the South Dakota Dietetic Association, but she has endeared herself to those of us who did not previously know her well. The value of her work is indicated by the comments of Sister M. Inez, O.S.B., President for 1956-57 of the South Dakota Association, who wrote the headquarters office: "We appreciated the help Mrs. West gave us and the passing on of her enthusiasm as well as her encouragement. Her two visits here were the keynote of the conference. I am quite sure that if she had not made the effort to be here for our Executive Board meeting, we would not have sponsored the conference. It might have been one of those things that sounds like a wonderful idea, but no one has the courage to go ahead and do. From experience, we can now say it not only was a good idea but well worth the effort."

Mrs. West made a progress report on her work at the meeting of the House of Delegates of the Association on October 21 in Miami.

She will be missed in the headquarters office, but we know that her interest in Association activities and profressional developments will continue unflagged and that her help and advice will be available when we need it. The program for which she has now done the spade work will be continued. Her successor will be announced later.

Full-time personnel in U.S. hospitals in 1956 numbered 1,374,704, according to the American Hospital Association, an increase of 66 per cent in eleven years and nearly 6 per cent in the last year of the period. There were an average of 101 personnel per 100 patients, an increase of 28 people per 100 patients in eleven years.



CURRENT COMMENT

Workers' Morale Related to Supervisors' Orientation in Human Relations[1]

CAROL STOCKLEY DALY
Seattle, Washington

THE EFFECTIVENESS of an organization depends to a great extent on its workers' morale. In attempting to discover the determinants of the workers' morale, investigators have turned their attention increasingly to the role of the first-line supervisor. The study reported here deals with the relationship, in college kitchens, between workers' morale and their perception of their immediate supervisor's "human relations-mindedness." "Perception of their supervisor's 'human relations-mindedness' " implies interpretation, by the workers, of their supervisor's intentions and concerns for other people.

The science of human relations in business had its beginning at the Hawthorne plant in Chicago of the Western Electric Company during the course of the now-famous illumination experiments (1). Begun in 1924, the purpose of these experiments was to study "the relation of the quality and quantity of illumination to efficiency in industry." The experiments are remembered, however, not for what they revealed concerning illumination, but for their implications for supervision.

The experimenters set up a test room where the lighting could be changed and a control room where the light remained constant. An elaborate mechanism was contrived to measure accurately the number of telephone relays each worker assembled. Then the electricians came in and changed the light bulbs for brighter ones. The workers' efficiency increased; they made more relays. Then even bigger bulbs were used; still more relays were produced. The brighter the light, the greater was the efficiency.

Then the experimenters reversed the procedure and decreased the illumination. Efficiency still increased. In fact, the illumination was decreased to the intensity of bright moonlight before efficiency slacked off and the workers complained. When the light bulbs were changed to others the same size, efficiency increased.

[1]Abstracted from a thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Home Economics, University of Washington, 1956.

Meanwhile, back in the control room, the workers knew, via the grapevine, what was going on in the test room, and the efficiency of the control group increased at a rate very close to that of the test group. There was no statistically significant correlation between the efficiency of the workers and the intensity of illumination for either group. What was the explanation? The workers had been given different supervisors (the experimenters).

In this and subsequent tests, the experimenters found that the *type of supervision* had such great meaning for the workers that it completely voided the effect of environmental factors on their efficiency.

More recent investigations also emphasize the importance of human relations in industry. Studies in war industries showed that companies or departments under the leadership of human relations-oriented men had negligible absenteeism or labor turnover as compared with "industry-wide chaos" in those respects (2, 3).

In a series of studies carried out by workers at the University of Michigan, a direct relationship was found between group productivity and the "employee-orientation" of the supervisor (4, 5).

It would seem, then, that workers' morale (or job satisfaction) might logically be associated with whether they feel their supervisor is concerned with their welfare. This latter factor will be referred to as the workers' "perception of their leader's human relations-mindedness" (PLHRM).

Method

The 134 subjects for this study were full-time employees in food service kitchens in colleges and universities in the State of Washington.

Two paper-and-pencil tests constituted the essential materials for the study. The Science Research Associates Employee Inventory (6) was used to measure morale, Medalia's Leadership Perception Scale (7) to measure the workers' perception of their leader's (supervisor's) human relations-mindedness (PLHRM).

The SRA Employee Inventory (6) is composed of seventy-six items, measuring five main areas of morale, which are subdivided into fifteen categories as follows:

1. Job and condition of work
   a. Job demands
   b. Working conditions
2. Financial rewards
   a. Pay
   b. Employee benefits
3. Personal relations
   a. Friendliness and cooperation of fellow employees
   b. Supervisor-employee interpersonal relations
   c. Confidence in management
4. Operating efficiency
   a. Technical competence of supervision
   b. Effectiveness of administration
   c. Adequacy of communication

5. Individual satisfactions
   a. Security of job and work relations
   b. Status and recognition
   c. Identification with the company
   d. Opportunity for growth and advancement

The Leadership Perception Scale (7) is a ten-item test dealing with the supervisor's concern for obtaining spontaneous cooperation, his other-centeredness, and sensitivity to interpersonal feelings and social norms related to the work situation.

After the cooperation of the supervisors of the various units was obtained, the investigator conducted the tests with each group. The workers' anonymity was safeguarded by such measures as asking them not to sign their names and having them deposit their completed tests in a locked ballot box.

Each test yields a total score, so that the morale scores could be compared with the PLHRM scores, using the Pearson product moment coefficient of correlation (r). Item analyses were done to discover the relative importance of the components of the morale test both with respect to morale and to PLHRM.

Results and Conclusions

The correlation r was found to be 0.61, N = 134.[2] In other words, workers who perceived their supervisor as human relations-minded had significantly higher morale than those who did not. And, conversely, those who had high morale saw their supervisor as more human relations-minded than those with low morale.

This does not, of course, indicate that one was the *cause* of the other. In all probability, they were both related to a number of other variables. Some light is thrown on this relationship by an investigation of the components of morale and their relationship to the total morale score and to PLHRM.

By doing an item analysis, it was possible to arrange the morale areas and categories in the order of how great an effect they had on morale (this we will call the morale grouping) or on PLHRM (and this will be called the PLHRM grouping). Thus, "Operating efficiency" and "Personal relations" ranked first and second in importance in their effect on morale. "Financial rewards" was at the bottom of the list of morale areas. It should be pointed out, however, that this does not indicate that the workers were not concerned with their pay. Rather, it shows that no matter how good or poor their morale, they were all equally concerned with their pay. This concern continued regardless of the human relations-mindedness of their supervisor.

However, to get a more detailed picture, the subdivisions of the morale categories were arranged in the order of their effect on morale. Then, the categories of "Effectiveness of administration" and "Confidence in management" headed the morale grouping, while "Technical competence of supervision" and "Supervisor-employee interpersonal relations" headed the PLHRM list. That is, for those who had a particularly good or poor opinion of their supervisor's human relations-mindedness, their morale was affected more by the behavior of this supervisor and their relationship with him than by the policy of administration or management. On the other hand, for the entire group tested, administration and management were of more importance to their morale than was their immediate supervisor.

Thus, when the workers were grouped on the basis of PLHRM, the most discriminating category was "Technical competence of supervision." That is, the more human relations-minded they perceived their supervisor to be, the more competent they thought he was in the technical aspects of his job. And, the higher their regard for his technical competence, the more human relations-minded they felt he was. It seems likely, then, that technical competence and human relations-mindedness were mutually reinforcing factors in determining a supervisors' actual effectiveness as well as his workers' PLHRM.

It is interesting that, whether PLHRM is considered or not, "Supervisor-employee interpersonal relations" was of greater importance to the workers' morale than was "Friendliness and cooperation of fellow employees." This may reinforce the theory of those who feel that an important part of the role of the supervisor is that of setting the mood or determining the emotional atmosphere of the work situation. The argument is especially convincing when it is considered that the worker's interactions with his fellow employees, while more extensive, more frequent, and more diversified were nevertheless less important in determining his morale than were his interactions with a single supervisor.

Obtaining the spontaneous cooperation of the workers is the function of the so-called "collaborative activities" of an organization. In the PLHRM grouping, the second, third, and fourth most important categories were of this type. The second—"Supervisor-employee interpersonal relations"—was in eleventh place on the morale grouping; the third—"Status and recognition"—was in eighth place; and the fourth—"Identification with the company"—was in tenth place. In other words, the collaborative activities moved up on the scale of importance when human relations-mindedness was considered.

Thus, these collaborative activities were better received when the supervisor was human relations-minded. This acceptance by the worker of the company's intentions was probably important in obtaining the desired response—spontaneous cooperation. And, it is the expectation of management that this spontaneous cooperation will lead to higher produc-

[2]To be significant at the 5 per cent level of confidence, r must be at least 0.196; at the 1 per cent level, r must be 0.228.

tivity. The present study does not have any measure of productivity and so cannot show any relationships between productivity and morale or PLHRM. However, it does indicate that the workers' PLHRM was related to the company's collaborative efforts.

Summary

Paper-and-pencil tests were conducted among kitchen workers to determine their morale and their perception of their leaders' "human relations-mindedness." The following relationships were found:

(a) There was a significant direct positive correlation between workers' morale and their perception of their leader's human relations-mindedness.

(b) There was a positive relationship between the operating efficiency of an organization, as perceived by the workers, and their morale.

(c) The workers' pay was the least important item in determining their morale.

(d) PLHRM was positively related to the "Technical competence of the supervisor."

(e) "Supervisor-employee interpersonal relations" had a greater effect on morale than "Friendliness and cooperation of fellow employees."

(f) PLHRM (perception of leader's human relations-mindedness) was positively related to the collaborative activities of the company.

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Management's Viewpoint on Safety[1]

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DO YOU ever wake up at night thinking about the problems of your job? After a serious employee injury, does your conscience ask you questions?

Take, for example, a problem such as the butcher who lost his hand and forearm in a meat grinder. The plate was there on the meat rack behind the grinder. He had a wooden push-stick right on the feed table. "Why did he push the meat in with his hand? Why was the guard off? I can't be there to supervise my employees every minute. What can I do to stop such carelessness and prevent such accidents?" If your conscience never bothers you about your accident-prevention duties, you are fortunate. I hope it is because of the success of your accident-prevention efforts.

There are several approaches to employee safety —humanitarian, statistical, and cost—but I would like here to consider the administrative approach. A good accident-prevention program involves both the setting forth of policies by management and the application of those policies by line supervisors.

We know that the best accident-prevention work is done through regular line management—the supervisors who are on the job in the production areas. Through regular, organized channels, from management to supervisor to workers, we communicate our safety program and philosophy. But, there are still accidents.

Let us consider the duties of management and the people at the supervisory level, then the flow of accident information, and last, some of the uses of such information to achieve effective accident-prevention.

Written policies and procedures are the responsibility of management, who must in turn delegate to supervisors the duties and authority to carry out these policies.

Reporting Accidents

As the employer's agent, the supervisor of an injured employee must investigate and report every accident—and he must do everything reasonably possible to prevent the recurrence of similar accidents. When an employee reports an injury during and from his work, his supervisor's reporting work starts. To get the facts, the supervisor must go to the place of the accident, where he observes personally the circumstance and conditions of the work situation and questions the injured person and others who are sources of information. From this

[1]Presented before the Institution and School Lunch Section, California Home Economics Association, in San Francisco on April 14.

personal investigation, he then makes his report on forms which provide space for who, when, where, what, and why. His final report will cover: physical conditions, actions of people, and sequence of events, as well as what the injury was. Personal injuries and damage to physical property are the results of accidents. Knowledge of resulting injuries—alone—does not indicate what must be done to prevent accidents.

Physical Conditions

In analyzing the accident, he must indicate the conditions prior to the accident of the work place or environment and the equipment involved. He observes the damage and tries to visualize and reconstruct the previous conditions. Machinery, processes used, and other contributing factors must be considered. Safety devices and safeguards—missing or in use—should be noted. What made the floor slippery? He must record both good and bad conditions of the place of employment as factually as possible.

Actions of People

From his questions, he will try to determine what the actions and intentions of the injured employee were prior to the accident. What was the employee attempting to do? Was he authorized to do such work? Did he have the skills and training to do it? Were there distracting influences? Were there other factors which contributed to his acts? The answers to such questions should enable the supervisor to reconstruct the employee's position, posture, and movements prior to the accident.

However, a word of caution may be interposed here. In questioning the injured employee, listen carefully for a built-in bias. Often, a person does not recognize his own unsafe habits, even after they have contributed to an accident. And, people are loathe to admit their faults, even when they recognize them. We are all prone to look for defensive reasons to excuse our shortcomings, and if the story fits the physical facts well, it is an understandable one.

Sequence of Events

The physical conditions and actions of people, when taken separately, may not necessarily produce accidents. Only a special combination of conditions and actions together may result in an injury. By knowing the sequence of events that led up to an accident, the supervisor, in writing his report, can then begin to recognize the things which should be interrupted to prevent recurrence of a similar accident.

Injuries Sustained

Although knowledge of injuries alone does not indicate what must be done to prevent accidents, the personal injuries inflicted and the damage to physical property resulting from an accident must be described. This can be done in layman's terminology and need not be technical in its details. The seriousness of injury and expense of damage often motivate management to justify expenditures and establish policy.

Corrective Actions

Supervisors must report the facts and their opinions as they see them. Supervisors must also make decisions and initiate corrective action. The reports of the supervisors thus serve to prod management to take corrective actions to prevent the repetition of similar accidents. Within his authority, of course, the supervisor can take many steps himself, but other changes may require policy changes by management.

To decide what corrective actions should be taken, the supervisor can analyze the preceding items on his report to learn what were: (a) unsafe acts; (b) unsafe conditions; and (c) reasons for the causative factors.

Unsafe Acts and Conditions

Based on the preceding information, the supervisor can now write down each unsafe act of people—habits, distractions, procedures, and contributing personal factors that can be considered both as actual and reasonably probable unsafe acts. Likewise, each unsafe condition or physical arrangement that contributed to the accident can be listed. Some of these, of course, may be beyond the supervisor's authority to change or control, but a record of them can be made for consideration by higher authority. In this connection, the status of safety devices should certainly be included.

With the unsafe acts and conditions listed, it should be possible to trace and identify the reason for each one. The supervisor can decide, in his own opinion, why it occurred or existed. Such reasons may be both real and reasonably probable.

Now, the supervisor is ready to decide on a course of action to prevent a similar accident in the future. What he does will depend on his ability and the limits of his authority. He can give on-the-job instructions to his employees and hold safety meetings focusing their attention on unsafe habits and practices. In this way, many hazardous conditions can be corrected within his authority.

And, he also has the responsibility to refer those things beyond his authority to a superior. However, it is wishful thinking on the part of the supervisor to believe that his report alone will immediately cause corrective actions to be taken by management. The report must request the specific action felt necessary and may even include a job order or draft of a proposed policy and procedure statement. The

supervisor's opinion may be modified or rejected by higher authority, but such a report with request for action by management will get answers and decisions.

Review by Management

When a report of an accident is made to management, the supervisor should discuss in person the report with his superior. The superior needs to know the answers to the following questions:

(a) Was the injured person observing known safe practices and procedures?

(b) Has the supervisor initiated reasonable action to prevent a recurrence of a similar accident?

(c) Has the supervisor used his available authority to establish safe practices?

(d) What has been learned about the causes of accidents and the corrective action that should be used as information for others?

(e) What can the superior do to prevent a similar accident in the future?

In reviewing the data submitted by the supervisor, the superior can consider also the supervisor's actions. Are there conflicts between the employee involved and the supervisor? Does one or the other need advice or counseling? Whose attitudes and habits should be oriented to achieve safety-consciousness? At each level of management review, authority and responsibility increase; also, the matter of accountability broadens until we reach the over-all span of the organizational head.

The reviewing superior should make his decisions and indicate his action by endorsement. For example, matters that require expenditures beyond certain limits require referral through channels to ultimate authority. While the organization waits for authorization, direction, and completion of such work, the controlling authority then assumes the responsibility of lower management for injuries that may result due to the lack of action.

Safety Education

We know that once an accident has happened, it must be considered possible that it will occur again in the organization. Organized accident prevention depends on a plan, established as policies and procedures that require continuous attention to safety work. From the lessons learned from specific cases and from the reports of the supervisors, come facts which can form the basis of an effective safety program, including policies and procedures, planning of future job assignments, on-the-job instructions, and so on.

Educational and resource material must flow continuously through all channels. Management must have staff meetings to consider and establish policies and approve informational materials. At the end of the flow, each supervisor must be conducting regular face-to-face safety meetings with employees within his span of control. These need not be long—10 or 15 min. once a week, during which the supervisors discuss safety information and develop "safety consciousness" in the employees, so that they will think and act "safely" all the time.

Summary

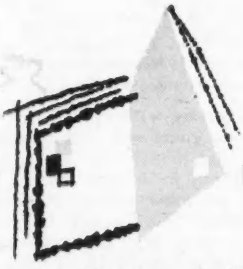
In developing management's viewpoint on safety, the administrative approach has been emphasized, considering procedures to be carried out by supervisors to use each accident as a means of achieving future accident prevention. Only from a detailed study of each accident can management and supervisors learn what they must do to prevent effectively, employee injuries.

Man's "Missing Step" in Ascorbic Acid Synthesis

A "missing step" in the body's ability to produce ascorbic acid may explain the cause of scurvy. The "missing step" is common only to man, monkeys, and guinea pigs. All other mammals have the ability to synthesize ascorbic acid.

The findings of Dr. J. J. Burns, biochemist of the Public Health Service's National Heart Institute, Bethesda, Maryland, indicate that man, monkeys, and guinea pigs are missing an enzymatic step found in all other mammals in which a product of sugar metabolism in the body (L-gulonolactone) is converted into ascorbic acid. The missing enzyme system was uncovered by tracing similar amounts of L-gulonolactone administered to rats and guinea pigs. Previous work had established that L-gulonolactone is a forerunner of ascorbic acid in the liver of the rat, an animal capable of manufacturing its own ascorbic acid.

It was observed in this experiment that while the rats converted the forerunning, L-gulonolactone into ascorbic acid, the guinea pigs did not. Further experiments with rat, monkey, guinea pig, and human livers in the test tube corroborated these results.



BOOK REVIEWS

Teaching Nutrition. By Mattie Pattison, Helen Barbour, and Ercel Eppright. Ames, Iowa: Iowa State College Press, 1957. Cloth. Pp. 212. Price $3.95.

This is primarily a handbook for presenting nutritional information, to be used by those who know the facts of nutrition and would seek to make these facts functional for people. Complicated technical information has been reduced to generalizations applicable to the subject-matter approach to teaching nutrition. Methods of presentation and several ways of evaluation are suggested.

Investigations of Iowa population groups have served as a basis for the need of nutrition education, as well as indices for emphasis in nutrition teaching.

In answer to the question, "Why nutrition education?" the authors maintain that it is necessary to assure the quality of an individual's life. An informed public is needed to protect the nutritional well-being of both present and future generations. Dietary studies show where specific emphasis is needed in order to achieve good nutrition.

Objectives for nutrition education, information needed to achieve those objectives, and methods of organizing and presenting that information are clearly stated. The variety of examples and illustrations will be helpful in teaching nutrition at different age levels.

For those who wish a unique and compact review of nutrition, Chapter four entitled "Generalizations and Facts" will provide considerable material under eighteen major headings. Nutrition can affect your looks . . . , personality, work output, and growth. Good nutritional requirements are discussed in terms of nutrients and food management.

For those who would depart from traditional lecture methods, the suggestions on methods and tools for teaching will be most helpful. The use of the discussion-decision method, ways to help students learn to draw conclusions from their own experiences, the use of films, field trips, role playing, radio, television, animal feeding experiments, problem solving, and ways to work with parents—all should help improve nutrition teaching.

The review of problems in nutrition education (Chapter six) should concern all who teach in this area, and it should contribute much toward a workable understanding of some of the many complexities inherent in influencing what people know, think, believe, understand, do, and want with respect to what they eat. The final chapter, which is devoted to evaluation, not only presents steps to follow in determining what the students have learned but also some ideas about using evaluation as a way of improving teaching. The appendices undoubtedly will be used many times because of the specific plans they present. Indeed, this book deserves a rightful place on the library shelf of all nutritionists who profess to teach.—*Floy Eugenia Whitehead, D. Sc., Professor and Chairman, Department of Home Economics, State University of Iowa, Iowa City.*

Feel Like a Million. By Catharyn Elwood. New York: The Devin-Adair Company, 1956. Cloth. Pp. 380. Price $3.95.

The jacket cover of this book informs the reader that the author has been acclaimed "America's leading nutrition and health lecturer" and that she took "courses of study in the food-science laboratories of Cornell and at the University of Maryland." Scientists would question the use she makes of her background, and it is doubtful that the universities named would wish to claim her as an alumna—after reading her book.

She has quoted freely from medical journals and well known doctors, research scientists, and qualified nutritionists. All will be surprised to learn how she has distorted and exaggerated the results of research on animals and human beings.

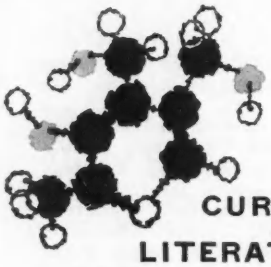
Her interpretations of research on vitamin deficiencies are startling. For example: "Dr. V. P. Sydenstricker's investigation at the Georgia School of Medicine shows that a deficiency of biotin results . . . in mental depression that leads to mild panic. Can one possibly know these things and not pose the question: 'If mild deficiencies can lead to "mild panic" isn't it possible that some of our seriously unbalanced minds, even the raving maniacs of our mental hospitals, have been starved for years for this "cheerful cherub" vitamin? Here are some excellent recipes (using biotin) easily made on your liquefier'."

She appeals to religion and our emotions to get across her "message." She tells of visiting a family in mourning for the death of the thirty-eight-year-old father. When she came into the house, the children were sitting at the table eating white bread. "She (the mother) killed him but she loved him. There on the table is mute evidence of her weapon. And now she is crippling their beautiful children. Silently, slowly, painlessly. The children of the man she loved and killed. Oh God, please show us how to put this vitally important message of food and life over to these kind, loving, but nutritionally ignorant people."

The author also quotes statements out of context to suit her own ends. The Department of Agriculture, I am sure, would be surprised to know that its Basic 7 had led thousands into the muscular dystrophy camp and the heart failure grave. She says, "I wonder if there can possibly be a connection between such foods and this announcement published in *The Journal of the American Medical Association:* 'Seventy-seven per cent of 300 American soldiers—average age 22—who had no evidence of heart disease before, had coronary heart disease at post-mortem, following action in Korea.'"

The reader searches in vain for references to such statements as: "Our degenerative diseases are mounting by leaps and bounds: heart trouble, hardening of the arteries, cancer, arthritis, nervous disorders, neuritis, tuberculosis, pneumonia, and tooth decay, just to mention a few. Many of our leaders agree that these degenerative diseases are the result of accumulated nutritional deficiencies." The author even devotes separate chapters to prescribing treatment for arthritis, ulcers, cancer, heart conditions, and mental illness with the use of special foods.

Feel Like a Million may have great popular appeal because of the author's dramatic approach and her free use of well known names in the medical profession. It is quite possible that it will be given a prominent place in the nutrition sections of public libraries and might even become a "best seller" in book stores unless. . . Well, that's up to the readers of this and other professional publications.—*Phyllis Folda, Clinic Dietitian, VA Regional Office, Cleveland, Ohio.*



CURRENT LITERATURE

Contributed by Janette C. Carlsen, The Johns Hopkins Hospital, Baltimore; Clara Karl, University of Chicago Clinics; and the Journal staff

THE AMERICAN JOURNAL OF DIGESTIVE DISEASES

Vol. 2, July, 1957

* Reevaluation (VI): What is hepatic coma? S. Sherlock.—p. 353.

Hepatic Coma. In treating patients with hepatic coma, all dietary protein is stopped, and at least 1600 calories are supplied daily as glucose drinks or as 20 per cent glucose through an intragastric drip. When necessary, 40 per cent dextrose is used intravenously through polythene tubing introduced via an antecubital vein into the innominate vein or superior vena cava; small veins would be thrombosed by glucose of this strength. During recovery, protein is added in 20-gm. increments on alternate days. Patients with an acute episode of coma soon achieve normal dietary protein intake. In the chronic group, permanent protein restriction is needed to control mental symptoms. The limit of tolerance is usually 40 to 50 gm. per day. Vitamin K and B-complex supplements are given parenterally. Prognosis depends on the state of the liver cells. The chronic group with relatively good liver function, but with an extensive collateral circulation combined with increased intestinal nitrogen, have the best prognosis, and the group with acute hepatitis, the worst. In cirrhosis, the outlook is poor if the patients have ascites, jaundice, and a low serum albumin level, all indicative of poor liver-cell function.

THE AMERICAN JOURNAL OF MEDICINE

Vol. 23, August, 1957

Gastrointestinal malabsorptive syndromes. W. Volwiler.—p. 250.

Vol. 23, September, 1957

* Potassium movement in normal subjects. Effect on muscle function. D. Grob, A. Liljestrand, and R. J. Johns.—p. 340.

Effect of Potassium Movement on Muscle Function. Study in normal subjects of potassium movement and associated changes in skeletal muscle function yielded the following results. With muscle contraction, potassium moved out of muscle, as indicated by change in the arteriovenous difference in the exercised extremity. There was some evidence to suggest that rest had the opposite effect. During hypopotassemia following glucose administration and possibly following epinephrine, there was evidence of movement of potassium into muscle, but after insulin, the ion moved out of muscle and into some other site, presumably the liver. Hyperpotassemia produced by potassium chloride administration was accompanied by movement of potassium into muscle. Muscle contraction then caused greater loss of potassium from the exercised extremity. Following tetanic muscle contraction or potassium chloride administration, and concomitant with a probable decrease in the ratio of intracellular to extracellular concentration of potassium, there was an increase in muscle contractility and in the ease of depolarization of ACh or neostigmine. Following administration of insulin and glucose, and concomitant with a presumed increase in the concentration ratio of potassium, there was a slight decrease in the ease of deplorization by ACh. This change is attributed to an increase in the resting muscle membrane potential resulting from the increased concentration ratio. It is suggested that severe weakness may be infrequent in hyperkalemia, and in hypokalemia due to deficient intake or excessive loss of potassium or the administration of insulin or glucose, because the intracellular concentration of potassium may change in the same direction as the extracellular concentration in each instance, tending to limit the change in concentration ratio.

AMERICAN JOURNAL OF PHYSIOLOGY

Vol. 189, June, 1957

* Influence of a protein-free diet on the immediate and latent effects of stilbestrol. S. R. Glasser.—p. 441.

Effect of Protein Diets on Stilbestrol. The absence of protein from the diet of stilbestrol-treated rats modified, largely quantitatively, the response to the hormone. Stilbestrol *per se* induced a body weight loss which was greater in the protein-depleted than in the protein-fed animal. Recovery on an adequate protein diet after withdrawal of the hormone permitted an immediate recouping of weight losses, whereas animals on the protein-deficient diet did not recover lost weight. Stilbesterol administration increased excretion of nitrogen indirectly by restriction of food intake. This nitrogen loss was augmented by protein depletion. The marked retention of nitrogen by animals recovering on an adequate diet was more pronounced in the treated animal, but rats continued on the protein-deficient diet maintained a negative nitrogen balance. The absence of protein from the diet diminished the anticatabolic influence of stilbestrol on total liver protein. A marked increase in the concentration of liver fat appeared with the depletion of liver protein in both treated and untreated groups.

AMERICAN JOURNAL OF PUBLIC HEALTH

Vol. 47, September 1957

* Food poisoning outbreaks associated with spray-dried milk—an epidemiologic study. R. Armijo, D. A. Henderson, R. Timothee, and H. B. Robinson.—p. 1093.

Food Poisoning with Milk. Nineteen outbreaks of gastroenteritis occurred during a one-month period among school children in Puerto Rico. Epidemiologic evidence pointed to spray-dried, nonfat milk powder as the responsible food and clinical symptomatology and incubation period to staphylococcal enterotoxin as the responsible agent. Although food poisoning related to spray-dried milk has been reported once from England, these outbreaks are the first in the United States. Indicative, but not conclusive, food histories suggested spray-dried milk as the responsible food. Although bacteriologic studies were negative, plate count records of samples from one of the seven processing plants involved were shown to be clearly in excess of other plants. Considering that the staphylococcal organism is much more sensitive to heat than its enterotoxin product, it is probable that the negative bacteriologic results may be the result of the destruction of the organism but not the toxin. Momentary heat drying in the production of dried milk is insufficient to destroy formed staphylococcal enterotoxin.

THE BRITISH JOURNAL OF NUTRITION

Vol. 11, No. 2, 1957

* Protein metabolism in chronic severe malnutrition (kwashiorkor). Absorption and retention of nitrogen from a typical poor Mexican diet. F. Gómez, R. Ramos-Galvan, J. Cravioto, S. Frnk, C. de la Peña, M. E. Moreno, and M. E. Villa.—p. 229.

Protein Metabolism in Kwashiorkor. Variously known by such names as "kwashiorkor" (Africa), "shibi gachaki (Japan), "protein malnutrition" (WHO), and "Mehlnährschaden" (Germany), chronic severe malnutrition is one of the most prevalent pathologic conditions suffered by children living in underdeveloped countries. Surveys in different parts of the world have shown that the diets of such children are very similar, not only in their nutritional value, but also in the foods actually eaten. The diet after weaning is low in calories, fats, and proteins, high in carbohydrates, and contains insufficient amounts of vitamins and minerals. In this study, nitrogen-balance experiments were made on eight Mexican children, ages one to five years, who were affected with chronic severe malnutrition. They were kept on a diet of corn meal and beans. Both nitrogen absorption and nitrogen retention were extremely variable from one child to another. Four children were in positive nitrogen balance and four in negative. No correlation could be found between

the caloric intake and the nature of the balance. The fact that some children retained nitrogen from a diet as poor as this may help to explain why some develop severe malnutrition and others remain reasonably healthy even when all have almost the same dietary habits.

BRITISH MEDICAL JOURNAL

No. 5039, August 3, 1957

* Folinic acid in megaloblastic anemia of pregnancy. J. M. Scott.—p. 270.

No. 5040, August 10, 1957

* Clinical experience with tolbutamide. G. Walker, J. D. H. Slater, E. K. Westlake, and J. D. Nabarro.—p. 323.
* Tolbutamide in diabetes. Some clinical and biochemical studies. M. F. Crowley, F. W. Wolff, and A. Bloom.—p. 327.
* Effect of a gluten-free diet on idiopathic steatorrhea. A. Brown.—p. 337.

No. 5041, August 17, 1957

* Influence of high-protein diets on liver-function tests in kwashiorkor. A. A. Kinnear and P. J. Pretorius.—p. 389.

Megaloblastic Anemia of Pregnancy. Nineteen patients with megaloblastic anemia of pregnancy and the puerperium have been treated with folinic acid ("leucovorin"), and the results have been reviewed. Sixteen received treatment over a limited period until the reticulocyte response reached its peak. Eleven of these were antenatal anemias, and though their treatment was discontinued, all continued to improve. At term their average hemoglobin was 10.4 gm. per 100 ml. and red cell count was 3,350,000 per cubic millimeter. To produce satisfactory response with this short-term therapy, it was found that the folinic acid had to be given in sufficiently large amounts initially and that the amount necessary appeared to be independent of the degree of anemia and the route of administration. From these findings it seems unlikely that the megaloblastic anemia of pregnancy is due to an absolute deficiency of folinic acid. Instead, the latter would appear to act more as a catalyst at some stage in the hemopoietic process, and evidence is brought forward to show how the demand for folinic acid itself may be further reduced, once normal erythropoiesis is established.

Experience with Tolbutamide. A study of seventy-two patients treated with tolbutamide for up to one year suggests that about 50 per cent of those with mild diabetes which cannot be controlled by diet alone will benefit from it. It is felt that, as it is a relatively new drug and its mode of action and possible long-term ill effects are not yet known, tolbutamide should be used cautiously and that patients treated with it should be selected and supervised carefully. It should be given only to adults who are not excessively overweight, whose diabetes cannot be controlled by diet alone, and who do not become ketotic even when untreated. The response may be evident immediately or only after several weeks. Patients who respond usually gain weight and must follow a diet restricted in calories and carbohydrates. Increasing weight is often associated with decreasing effectiveness of the drug, but two patients who did not gain weight became truly resistant.

Tolbutamide in Diabetes. Tolbutamide was used in the treatment of forty-two patients on standard diets whose diabetes was neither so mild as to be controlled by diet alone nor so severe as to need insulin immediately. All twelve patients who failed to respond showed acetonuria with a tendency to higher blood- and urine-sugar levels than those treated successfully. Thirty patients responded to tolbutamide and were maintained on this therapy for six weeks. In twenty-three of these, relapse has not occurred thus far on discontinuation of treatment. Seven patients relapsed following discontinuation of tolbutamide. The drug was successfully reintroduced in six of these. When tolbutamide treatment was given in the form of 1 gm. twice daily, the concentration of the drug in the blood differed from that found when treatment was by a single dose of 2 gm. However, the effect on the blood and urine sugars was the same. Analyses of plasma amino-acid nitrogen and inorganic phosphorus indicate that tolbutamide has a mode of action different from that of insulin. No toxic effects due to tolbutamide were observed.

Diet in Idiopathic Steatorrhea. The beneficial effects of the exclusion of gluten from the diet in three patients with idiopathic steatorrhea are reported. Two were adolescents in whom the defect had existed since early childhood. The third was an adult in whom the disorder had probably existed for many years. The major disturbances in these patients were folic acid deficiency and iron deficiency; severe retardation of general development and puberty changes, and celiac rickets (one); and skeletal decalcification (one—the adult). The exclusion of gluten from the diet was sufficient to correct the defect in fat absorption and also the other disturbances, with the exception of the iron deficiency, which was shown to be due to a non-"gluten-induced" defect in iron absorption. The two adolescents showed "flat" oral glucose tolerance curves which were not influenced by the exclusion of gluten. The dietary regimen in the adolescents was imposed for fifteen and twenty-four months respectively. In both cases, features attributable to relapse appeared fifteen months after a normal diet was resumed, and at this stage, defective absorption of fat was again present.

High-Protein Diets in Kwashiorkor. The influence of a high-protein diet on serial liver function tests in 107 consecutive cases of kwashiorkor is reported. The various high-protein diets included dried skim milk without vitamin supplement, dried skim milk with vitamin supplement, casein formula with vitamin supplement, and casein formula without vitamin supplement. No difference in efficacy in returning liver-function tests to normal could be found between the various diets tested.

THE CANADIAN MEDICAL ASSOCIATION JOURNAL

Vol. 77, August 15, 1957

* Increased activity of the coagulation mechanism during alimentary lipemia: Its significance with regard to thrombosis and atherosclerosis. J. F. Mustard.—p. 308.

Alimentary Lipemia. The decrease in the coagulation time of blood withdrawn from subjects during alimentary lipemia is associated with *in vivo* changes in coagulation. The number of platelets and AHG activity decrease while Christmas-factor activity increases. These changes are interpreted to mean that after the ingestion of food containing lipid(s) active in blood clotting, the activity of the first stage of thromboplastin formation is increased. These changes are prevented by an adequate dicumarol activity. It would seem that Christmas-factor activity must be reduced considerably to achieve this effect. It seems reasonable to speculate that the changes in the clotting mechanisms which follow the ingestion of butter, cream, bacon, and eggs may be a factor in thrombus formation under certain conditions and may play a role in the etiology of atheroma.

FOOD TECHNOLOGY

Vol. 11, September, 1957

* Pigment changes in packaged beef during storage. P. C. Pirko and J. C. Ayres.—p. 461.
* Freeze-drying of fruit. S. Jackson, S. L. Rickter, and C. O. Chichester.—p. 468.
* Time-temperature tolerance of frozen foods. VIII. Organoleptic evaluation of frozen strawberries, raspberries and peaches. D. G. Guadagni.—p. 471.
* Problems in taste difference testing. I. Test environment. J. W. Mitchell.—p. 476.
* Symposium—Studies in food science and technology. 1. The methodology of sensory testing. Insert, pp. 1—48.

Pigment Changes in Beef. Since color has been identified with freshness, the consumer relies on this criterion of quality to provide him with a satisfactory product. Reflectance spectrophotometry was used to measure spectra changes on the surface of beef packaged in different materials. From minimal reflectance values observed, wave lengths characteristic for myoglobin, oxmyoglobin, and metmyoglobin were identified. After storage for fourteeen days in a refrigerated display case, pigment changes were confined to the wave lengths characteristic of these three pigments. The packaging materials were divided into three groups. In group 1, the concentration of metmyoglobin reached a maximum on the sixth day; in group 2, on the fourth day; and in group 3, within the first day of storage. Results showed that there was least metmyoglobin formed in group 3—the materials being aluminum foil, 0.0015 in.; FX 831; 450

K202-Saran-coated cellophane; 517-Saran (gauge 50); and Cryovac. Also regeneration of desired pigment formation of meats packaged in these materials was possible for as long as fourteen days. Dessication of packaged meat was found to depend on thickness of meat cut, loss of weight being inversely proportional to thickness. Excessive loss of water resulted in surface hardening of the meat and a simultaneous increase in all reflectance values.

Freeze-Drying of Fruit. The increase in storage stability and acceptance of freeze-dried low-moisture products is known. If a fruit is reduced to below 5 per cent moisture, an increase in storage stability of approximately three-fold at normal storage temperatures can be expected. Freeze-drying is a rather time-consuming operation, and it may take 24 to 30 hr. to reach moisture levels below 5 per cent. It has been postulated that the limiting factor in the rate of freeze-drying is the rate of heat penetration into the fruit. In this work, a study was made of freeze-drying of peaches under different conditions of heat transfer. Four methods were investigated—dielectric, infra-red, double plate, and single plate heating. Of these, the dielectric work seemed the most promising for rapid lyophilization.

Time-Temperature Tolerance of Foods. A simple concept for the organoleptic evaluation of food products held at various temperatures is described. The procedure involves the use of an objective-type difference test, such as the triangle, to compare samples held at an experimental temperature against controls maintained at a temperature low enough to prevent deteriorative changes. The percentages of correct responses obtained in such a test are then plotted against time and the resulting curve provides information with regard to the rate and relative magnitude of the changes occurring at various temperatures. The curve obtained in this way also allows for comparison of results at any given probability level. Data are presented to show the effect of temperature and the reproducibility of the method over long periods of time. With commercial retail samples of frozen strawberries, raspberries, and peaches, it was found that 70 to 85 per cent correct judgments gave more accurate and reproducible results than the percentage corresponding to a 5 per cent level of significance, which has been used to indicate differences between samples in organoleptic tests. If all samples were identical and the tasters were equal, the result corresponding to a 5 per cent level of significance would occur five times out of every one hundred by chance alone. Since samples and tasters vary, there is considerable fluctuation using the 5 per cent level.

Effect of Distraction on Taste-Testing. It is agreed that a proper environment is necessary for successful taste-testing. Emperical evidence is offered on the effect of distraction on sensitivity in the taste-difference test. Conditions included: (a) one subject testing, (b) two or more subjects testing at one time, (c) one or more subjects testing, with noise or distraction occurring. A lowering of sensitivity was shown between condition (a) and (b). A drop in sensitivity was also shown between condition (b) and (c). The influence of psychologic and physical environments on the sensitivity of the difference test is demonstrated.

Effect of Time in Taste-Testing. The serious effect of environmental conditions on the sensitivity of the taste-difference test has been shown. This study investigated the psychologic and physical effect of time on the sensitivity of the taste-difference test subject. The time of the day and the day of the week were considered. It should be noted that both parts represent a continuous and relative effect, since each piece of data is dependent on preceding data. The same subjects tested every week day, and Tuesday was the best day. This does not mean that, if subjects test only one day, Tuesday will necessarily be best. It could mean that the second day of testing would be the best. Similarly, the same subjects tested during all hours of the day, and the middle of the day was found to be significantly superior. This, however, does not mean that the middle of the day will be best when subjects test just once a day. It is important to realize that the human subject is not capable of machine-like performance. The laboratory supervisor must evaluate the various influences that may affect his subjects when he interprets his results. This study refuted the after-meal dullness theory, as the period immediately after lunch was better for testing than most of the other times of the day.

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY

Vol. 5, September, 1957

* Methionine and lysine supplementation of animal feeds. H. R. Rosenberg.—p. 694.

* Production of carbonyl compounds during irradiation of meat and meat fats. O. F. Batzer, M. Sribney, D. M. Doty, and B. S. Schweigert.—p. 700.

Amino Acids in Feeds. The amino acid most likely to be first limiting in the protein of commercial mixed feeds is either methionine or lysine. To help alleviate amino acid imbalance in these feeds, the chemical industry has spent much effort to devise economic processes for the production of synthetic methionine and lysine. Successful supplementation of a feed consists in adding the first limiting essential amino acids to the feed in such a manner as to achieve a balance with the second limiting essential amino acid, as any amount in excess of that needed for proper balance is lost. Whether all of the first limiting essential amino acids needed to obtain balance can be utilized depends on the energy content of the diet which regulates feed consumption.

Irradiation Effect in Meat. Previous studies on irradiated meat have been related to changes in the meat pigment myoglobin, sulphur-containing constitutents, proteolytic enzyme activity, and peroxide and free fatty acid production in meat fats. This investigation of the chemical changes occurring during gamma radiation indicate the formation of carbonyl compounds. The possibility of carbonyls from fat being involved in the suppression of off-odors prompted further investigation of these compounds. Extraction procedures and the behavior of the compounds with various chromatographic solvent systems suggest that those obtained from irradiated meat differ from those obtained from irradiated fat. Carbonyl compounds increase in both meat and fat with increasing irradiation dosages. Although these carbonyl compounds probably do not directly contribute to the off-odors in irradiated beef, they may have a role in decreasing the off-odors by reacting with the compounds (sulfhydryl compounds and amines) that do contribute. These reaction products would then be of more importance than the residual, unreacted carbonyls.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 165, September 7, 1957

* Serum iron, copper, and transferrin levels in malignant diseases. Foreign Letters–Austria.—p. 85.

* Wheat germ oil, unsaturated fatty acids, and atherosclerosis. Queries and Minor Notes. —p. 111.

* Milk consumption by adults. Queries and Minor Notes.—p. 113.

* Salting fresh meat to remove blood. Queries and Minor Notes.—p. 120.

Vol. 165, September 14, 1957

* Treatment of obesity with phenmetrazine hydrochloride, a new anorexiant. C. Ressler.—p. 135.

Vol. 165, September 21, 1957

* Reduction in elevated blood cholesterol levels by large doses of nicotinic acid. Preliminary report. W. B. Parsons, Jr., and J. H. Flinn.—p. 234.

* Nutritional problems in the aging and aged. H. Pollack. Council on Medical Practice, p. 257.

Vol. 165, September 28, 1957

* Infant feeding Foreign Letters–India.—p. 387.

Water tolerance test. Foreign Letters–India.—p. 387.

* Reflex vomiting after fatty meal. Queries and Minor Notes.—p. 421.

Serum Iron, Copper, and Transferrin in Malignancy. It has been found that in most patients with malignant diseases, particularly those with Hodgkin's disease, a decrease of the serum iron and transferrin level and an increase of the serum copper occur simultaneously. In other malignant diseases, such as forms of leukemia, these levels are altered

from the normal; the individual leukosis can be distinguished to a certain degree, since each type of leukemia shows a definite pattern for serum copper, iron, and transferrin. In eighteen of twenty-three patients with Hodgkin's disease, good results were obtained by cytostatic treatment. As the manifestations of Hodgkin's disease subsided, the serum iron, copper, and transferrin returned to normal in three patients. In five others, who showed no clinical improvement, these serums did not return to normal.

Wheat Germ, Unsaturated Fatty Acids, and Atherosclerosis. The effectiveness of wheat germ in preventing atherosclerosis has been questioned, since wheat germ oil contains the unsaturated fatty acids, linoleic acid and sitosterol. (Unsaturated fatty acids have been shown to reduce blood cholesterol levels.) However, to date it has not been proved that lowering of blood cholesterol by administration of unsaturated fatty acids specifically prevents atherosclerosis or subsequent coronary disease.

Adult Milk Consumption. Milk is an important source of nutrients which are needed throughout life, and its continued use by adults is desirable. There is no evidence that the drinking of 1 qt. a day by a healthy adult might cause metabolic disturbance or the deposition of renal calculi.

Salting Fresh Meat. The processing of raw meat according to Jewish dietary law increases the sodium content remarkably. An average piece of beef containing 55 mg. sodium per 100 gm. before processing, contained 234 mg. per 100 gm. after being salted according to the usual dietary law. If salting is not excessive, the soaking of salted meat in cold or warm water removes most of the salt. It is felt that if treated meat is to be used in a sodium-restricted diet, the meat should be cooked in a generous amount of fluid, and this broth be discarded.

A New Anorexiant. Phenmetrazine hydrochloride is a new anorexiant. It is an oxazine derivative with sympathomimetic properties, and its reported action is suppression of appetite, with minimal cardiovascular and central nervous system stimulation. By means of a double-blind procedure, thirty obese patients were tested to measure its effectiveness. The total weight lost (an average of 15.25 lb.) and the average weight lost weekly (1.34 lb.) by each patient were five times greater for those on therapy with phenmetrazine than for those receiving placebos. No special stress was placed on diet, although the elements of a well balanced, 1100-calorie regimen were explained. There were no unusual side reactions, subjective complaints, or changes in physical findings to indicate toxicity of the drug.

Niacin and Cholesterol Levels. Prompt and sustained reduction of blood cholesterol levels was obtained in nearly all of the group of hypercholesteremic patients who received large doses of niacin. Daily doses higher than 3 gm. niacin were required in more than half the patients, and in some cases, 6 gm. daily were needed. No dietary restrictions were used. The mechanism by which niacin produces the changes in blood lipids remains obscure. The apparent failure of nicotinamide to produce this effect may provide a clue to the mechanism of action because of the slight chemical difference between the two drugs. Flushing and pruritus, which occur after ingestion of niacin, subsided within the first week of therapy in nearly all cases. No serious side reaction or toxic effects have been observed which can be attributed to niacin. It is felt that niacin is the most effective and practical agent yet introduced for reduction of elevated levels of blood choesterols. However, it is not implied that these changes will prevent or arrest atherosclerosis.

Nutrition in the Aged. With the increasing of the life span, a larger percentage of the total population is now in the old age group, and nutrition is one of the problems. Little is known of the aging process except that it is speeded up by the onset of certain chronic disease states—atherosclerosis and obesity being perhaps the most important. While the basis of good health is optimal nutrition, the cause of ill health is not always malnutrition from bad dietary practices. Optimal nutrition can be achieved without excess caloric intake. The obesity of the elderly is not due to gourmandizing, but mainly to a constant intake when requirements are decreasing. A survey in Boston of one hundred men and women over sixty-five revealed that 35 per cent of the men and 52 per cent of the women consumed 100 per cent of the recommended caloric allowances—2600 and 1800 calories respectively. Forty-eight per cent of these men and 57 per cent of the women were 10 per cent or more above their desirable weight. This suggests that for this roup, the allowances of the National Research Council are too high. Diet, as far as atherosclerosis is concerned, is still an open question. At present, a diet is recommended that will bring about and maintain optimal nutrition. When therapeutic diets are used, it must be made certain that the diet is not only adequate on paper but actually consumed. The patient may have difficuly in feeding himself. Dental or local oral lesions may cause poor eating. In other cases, there may be gastrointestinal disturbances, both functional and organic. Basically, the nutritional requirements for the aged are essentially the same as for younger adults. The decreased caloric requirements should be recognized.

Infant Feeding. The nutritional habits of children, most of whom were under five years of age, were analyzed in Madras, India. Over half has been breast fed at the age of two years. Milk and other protein foods were given to 41 per cent under one year and to 30 per cent between one and five years of age. Coffee is sometimes given as early as six months. The incidence of vitamin A deficiency, which was taken as an index of nutritional status, was maximal among children who were breast fed after twelve to eighteen months, with a steep rise in incidence after eighteen months. Those children who received supplementary milk in addition to breast feedings were found to be in better health. More cow's milk would alleviate many of the problems of child health.

Reflex Vomiting. Nausea and vomiting are basically reflex in nature regarding the stimulus. If vomiting occurs promptly after a fatty meal, the initiating stimulus must act on receptors in the oropharynx which may be sensitive to fat. Swallowing a tablespoon of any fat is normally rather difficult. If nausea or vomiting occurs half an hour or more after a fatty meal, it is probable that afferent vagus fibers of the stomach are stimulated.

THE JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 227, August, 1957

* Origin of the major specific proteins in milk. B. L. Larson and D. C. Gillespie.—p. 565.

* Carotenoids in man. II. Fractions obtained from atherosclerotic and normal aortas, serum, and depot fat by separation on alumina. D. H. Blankenhorn.—p. 963.

Origin of Milk Proteins. The proteins in milk have been considered not only to arise from the synthetic activities of the mammary gland, but also to include some preformed proteins which enter the gland from the blood and possibly other sources. Other investigators have shown that intravenously injected, radioactive precursors are incorporated rapidly into the milk proteins in the lactating mammary gland. Proteins synthesized in the gland contain a notably higher level of activity up to 24 hr. than proteins synthesized elsewhere and diluted by an existing protein pool. In this present study C^{14}, as sodium carbonate, was injected intravenously into a lactating dairy cow. The levels of C^{14} incorporated by alpha-casein, beta-casein, alpha-lactalbumin, and beta-lactogobulin suggest that these milk proteins are synthesized in the mammary gland from a common free amino acid pool. The levels of C^{14} incorporated by gamma-casein, the immune globulins, and milk serum albumin, and their similarity with the levels present in the blood proteins, suggest that these proteins enter the milk preformed from the blood stream.

Carotenoids in Man. The carotenoid pigments found in the lesions of human atherosclerosis are lipids known to have accumulated from exogenous sources and are of interest in relation to the manner in which atherosclerosis plaques are formed.

A method for micro-analysis of carotenoids in human blood serum, depot fat, and arterial wall is described. This procedure entails separation of carotenoids from other pigments into three major pigment classes. During the development of this method, several carotenoids not previously reported in human tissue were encountered. Zeta carotene, cryptoxanthin, prolycopene, and what appears to be an incompletely resolved mixture of cis isomers of lycopene were identified. Carotenoids are reported to be unselectively absorbed and stored by man. Hence, when new pigments are found, difference in diet must be considered as a cause. While regional differences in dietary may account for the small amount of cryptoxanthin found, zeta carotene and the cis isomers of lypocene cannot be as readily explained. Cryptoxanthin has been reported in a number of foodstuffs. However, zeta carotene, which is not readily mobilized or metabolized, is a rare carotenoid, and an explanation of its presence is uncertain.

JOURNAL OF CLINICAL INVESTIGATION

Vol. 36, August, 1957

* Exchange of ceruloplasmin copper with ionic CU^{64} with reference to Wilson's disease. I. H. Scheinberg and A. G. Morell.—p. 1193.

Copper Exchange and Ascorbic Acid. About half of the eight atoms of copper present in each molecule of the plasma protein, ceruloplasmin, have been shown to be capable of exchanging with radioactive copper. The exchange has been produced only when the protein and $copper^{64}$ are mixed in the presence of sufficient ascorbic acid to reduce reversibly the blue ceruloplasmin to its colorless form. The existence of such an exchange implies that ceruloplasmin copper can be reversibly released from the protein, at least in the presence of ascorbic acid. It is probable that reduction of ceruloplasmin copper to the monovalent form is essential for exchange to occur.

JOURNAL OF HOME ECONOMICS

Vol. 49, September, 1957

* From the minds of men to the lives of people. C. A. Elvehjem.—p. 503.

Research. In a keynote address at the opening general session of the American Home Economics Association meeting last June in St. Louis, C. A. Elvehjem, Dean of the Graduate School at the University of Wisconsin, made significant remarks on the relation of research at higher educational levels to the profession and work of the home economist. The article published in the *Journal of Home Economics* essentially reproduces his remarks, which included an examination of the motives for higher research, federal government sponsorship, individual requirements, freedom in research, and more specifically, research concerns for the home economist. His concluding remarks conveyed a hopeful belief that research will benefit home economics, and that any obstacles to an expanded graduate program with the aim of producing more doctoral candidates in the field will be overcome with constructive thinking and re-evaluation of the present situation in colleges and universities.

JOURNAL OF THE INDIAN MEDICAL ASSOCIATION

Vol. 29, August 1, 1957

* Water tolerance test in health and chronic illness and water diuresis. A. Ahmed.—p. 85.
* Studies of riboflavin metabolism during menstrual cycle. B. C. Bose, S. G. Gupta, and T. C. Phatak.—p. 96.
* Environmental sanitation in rural areas. S. K. Chatterji.—p. 123.

Vol. 29, August 16, 1957

* Total and available iron content of some foodstuffs of Bihar. S. B. Lal and S. P. Roychowdhury.—p. 139.

Water Tolerance Test. Retention of salt and water is a complication of many types of diseases. In severe anemia and hypoproteinemia, retention of salts and water leads to edema. About 15 lb. fluid may be accumulated in the tissues without demonstrating any sign of edema. The response of the kidney, in health and disease, to an increase in the water content of the body caused by drinking 1 liter water was studied. The healthy subjects eliminated an average of 908 cc. and the diseased subjects an average of 766 cc. urine within 3 hr. The peak diuresis occurred at 90 min. in both groups. No correlation could be seen between the hemoglobin or the total plasma protein concentration of blood and maximum urine flow per minute or total output of urine in 3 hr. after ingestion of the test water. When water is ingested in large volume, it goes into the tissue spaces and dilutes the salts retained there. The test dose of water eliminated within 3 hr. an average of 1.7 gm. and 1.75 gm. chlorides (as sodium chloride) from the body fluids of the healthy and diseased subjects respectively. More ingestion of water, 5 or 6 liters in 24 hr., would have depleted more chlorides from the tissue water with additional elimination of water, causing dehydration in the subjects. The influence of certain diuretics on water and chloride elimination are also given.

Riboflavin Metabolism. Riboflavin requirements have been known to vary with a number of physiologic factors, as this vitamin is essential for promotion of growth and metabolism of cells. Injection of blood serum from menstruating women has been found to produce sluggish activity in rats. It is felt that the metabolism of riboflavin is interfered with during menstruation. The present study was carried out by determining the basal urinary excretion of riboflavin during the menstrual period in women. The basal excretion of riboflavin and that after a test dose of the vitamin was found to increase gradually from pre- to post-menstrual period, thereby indicating that the body requirement for this vitamin during menstruation was decreased and continued to be so for a few days after the period. Riboflavin is an essential cofactor for the flavo-protein enzymes responsible for oxidation-reduction processes in the tissue cells. It is suggested that inhibition of flavo-protein enzyme by menotoxin might spare riboflavin for urinary excretion. Study of the effect of selected anti-malarials and other drugs acting on flavo-protein enzyme systems may elucidate this problem.

Rural Sanitation in India. Environmental sanitation conditions, including water, food, excreta, housing, and health, are discussed as they exist in West Bengal. Since independence, this state is doing much to improve rural health and sanitation. The achievements in the first five-year plan are listed. Also listed is the second five-year plan, during which it is hoped to complete the task left unfinished during the first. This perhaps can be achieved, provided the villages cooperate, both individually and collectively.

Iron Content of Foods in India. The iron content of foods in Bihar, India, was calculated. Total iron, available iron, and the percentage of available iron in total iron are given in a table. No group of foods shows a consistently higher figure than any other. It was observed that iron compounds added to the soil had little effect in increasing the iron contents of the plants.

THE JOURNAL OF NUTRITION

Vol. 64, September 10, 1957

* Iron absorption and metabolism. I. Interrelationship of ascorbic acid and vitamin E. S. M. Greenberg, R. G. Tucker, A. E. Heming, and J. K. Mathues.—p. 19.
* Iron absorption and metabolism. II. Substitution of N,N'-diphenyl-p-phenylenediamine (DPPD) for vitamin E. R. G. Tucker, S. M. Greenberg, A. E. Heming, and J. K. Mathues.—p. 33.
* The dietary composition and adequacy of food consumed by young men on an ad libitum regimen. F. Konishi, J. M. Hawkins, F. M. Berger, G. J. Isaac, and T. E. Friedemann.—p. 41.
* Observations on the cholesterol, linoleic and linolenic acid content of eggs as influenced by dietary fats. H. Fisher and G. A. Leveille.—p. 119.
* The effect of radiation sterilization on the nutritive value of foods. II. Biological value of pea and Lima bean proteins. V. C. Metta, H. W. Norton, and B. C. Johnson. p. 143.
* Studies of protein retention and turnover using nitrogen-15 as a tag. G. S. Sharp, S. Lassen, S. Shankman, J. W. Hazlet, and M. S. Kendis.—p. 155.

Iron Absorption and Vitamins. Preliminary studies of the effect of ascorbic acid on iron absorption in the rat led to the observation that an interrelationship seemed to exist between ascorbic acid and vitamin E in iron metabolism. The rate of hemoglobin regeneration in milk-fed anemic rats was consistently greater

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in rats supplemented with iron plus ascorbic acid and vitamin E than with iron alone or with iron plus either of the vitamins. In a long-term study, hemoglobin levels were better sustained after the cessation of iron supplements if the iron had been given concomitantly with ascorbic acid and vitamin E than if given alone or with either vitamin separately.

Iron Absorption and DPPD. The effect of substituting an antioxidant, DPPD (diphenyl-p-phenylenediamine), for vitamin E was tested in hemoglobin regeneration studies on milk-fed anemic rats. The average levels of hemoglobin regenerated and the average hematocrits were higher in the rats supplemented with iron plus ascorbic acid and the antioxidant than in those receiving only iron or iron plus either ascorbic acid or DPPD. However, since this study was completed, the Food and Drug Administration has banned the addition of DPPD to poultry feed because of toxic effects in pregnant rats.

Food Consumption *Ad Libitum*. A food intake study of almost a hundred soldiers was conducted under an *ad libitum* regimen for a four-week period. The mean daily intake of calories was 3669, protein, 150.7 gm.; fat, 162.3 gm.; and carbohydrate, 396.6 gm. All but three gained weight; the average gain was 2.03 kg. over four weeks. A parallel relationship was observed between caloric intake and energy expenditure for the same day. An equation is presented in this paper which was derived to estimate the caloric requirement for individuals of comparable age, sex, and size by using individual body weights and calorie intakes. One of the most significant observations was the high milk intake averaging 1½ qt. daily. The mean caloric and protein intakes were above the recommended allowances and above the minimum allowances specified by the Armed Forces for individuals under comparable activity levels.

Fatty Acids in Egg Fat. A practical means of incorporating large amounts of fat into a poultry ration was achieved through the addition of an absorbent to the diet. In this manner, the effects of tallow, corn, soybean, safflower, and linseed oil were studied in terms of the linoleic and linolenic acid composition of the egg fat. Linseed oil produced a large increase in both the linoleic and linolenic acid content of egg fat, while soybean and safflower oil only increased the linoleic acid content, despite the fact that soybean oil contains 7 to 8 per cent linolenic acid. The cholesterol content of egg fat was essentially unchanged by alterations in the fatty acid composition.

Radiation of Legume Proteins. The effect of radiation sterilization and of heat cooking on the nutritive value of the protein in the fresh garden pea and the Lima bean was investigated. Irradiated peas were acceptable to the rat, and radiation, like heat cooking, did not affect the digestibility of the raw pea protein. Short-time cooking did not affect the biologic value of the pea protein but radiation reduced it by 8 per cent. Cooking increased the acceptability and digestibility of the Lima bean. The biologic value was increased by 12 per cent. Radiation did not affect this value. The trypsin inhibitor present in raw Limas appears to be destroyed by heat and not by radiation. No difference in the nutritive value of the Lima bean protein was found when the heat-cooked beans were compared with the irradiated and subsequently cooked Lima beans. This indicates no damage to the Lima bean protein due to radiation.

Protein Retention and Turnover. Methods employing isotopes have been used to investigate both protein metabolism and metabolic rates. Nitrogen-15 was selected as the tag because it is the simplest specific protein indicator. This technique is the most direct way in which the turnover of the protein pool may be estimated. In this investigation comparative studies of retention of absorbed protein in young and older subjects is presented. The average retention in the young subjects was 57.6 per cent, but only 49.1 per cent in the older subjects. The rate of protein turnover in the young controls was approximately one and one-half times that in the older subjects. Increased physiologic age seems probable for this reduced utilization of protein. The average nitrogen requirement from the pool for protein synthesis in the body was found to be 0.23 gm. per kilogram per day. The nitrogen requirement for maintenance for a 70-kg. man was found to be 16 gm. per day.

THE JOURNAL OF SCHOOL HEALTH

Vol. 27, September, 1957

* Eat and be merry. D. Spurling.—p. 207.

Eat and Be Merry. It is becoming increasingly evident that the same food that builds strong and healthy bodies and maintains normal weight, plays an important part in mental health and in emotional behavior. Nutrition in the early years plays a significant part later in the health and weight of adults. It has been shown that the child's early feeding experiences are the foundation of many of his life patterns, as well as his attitudes concerning food and eating. To properly cultivate good food and eating habits in children, it is recommended that anxiety, stress, and conflict be banished from the dining table. Activity should be encouraged, as it has been shown that obese children often do not ingest more calories than their contemporaries of the same sex and of similar age and build, but they are less active physically. This bears out the observation that many obese adults take little active interest in life and use food as a solace for boredom. The only answer to obesity is prevention, it is stated. And, prevention begins in childhood with the inculcation of proper attitudes and habits. The school lunch program is helping in the task of forming good eating patterns in children.

THE LANCET

No. 6987, July 27, 1957

* Diet and coronary thrombosis. Hypothesis and fact. J. Yudkin.—p. 155.

* Hemochromatosis, African nutritional siderosis, and experimental siderosis in animals. T. Gillman, N. McE. Lamont, M. Hathorn, and P.A.S. Canham.—p. 173.

No. 6989, August 10, 1957

* Rapid weight-changes in mental patients. J. L. Crammer.—p. 259.

* Intramuscular iron in the treatment of the anemia associated with kwashiorkor. H. C. Trowell and M. J. Simpkiss.—p. 265.

Diet and Coronary Disease. A consideration of some of the more readily available data on the incidence of coronary deaths and on food consumption makes it difficult to support any theory which supposes a single or major dietary cause of coronary thrombosis. It is suggested that relative over-consumption of food, associated with reduced physical exercise, may be one of several causes, which are likely to be divisible into predisposing and precipitating causes. These causes need further investigation. Their identification requires more study of groups where some of the possible causes are relatively constant, so that differences in incidence of coronary disease may be related to the other possible causes. For instance, one cause may be decreased physical activity. The countries with higher incidence of coronary disease are those with, in general, greater leisure. There is quite a reasonable relationship between the number of automobiles and the incidence of the disease in different countries, as there is between the rise in both in Britain in the past thirty years. It is in the more sedentary occupations that mortality is usually higher.

African Nutritional Siderosis. Evidence is presented indicating the existence of a specific metabolic distinction between nutritional siderosis in the African, experimental siderosis in animals, and idiopathic hemochromatosis in Europeans. Biochemical data seem to substantiate the contention that some metabolic disorder (possibly nutritionally conditioned) probably underlies and precedes the massive uptake of dietary iron and the consequent severe siderosis so often found in Africans, not only in Johannesburg but also in Durban. The investigation is being actively prosecuted on the appallingly abundant African siderotics in Durban, where at least four hundred to five hundred severe cases are admitted annually to the hospital alone. Further reports will be made as investigation with radioactive isotopes is concluded.

Rapid Weight Changes in Mental Patients. A group of mental patients

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were weighed daily for some months. In three, diagnosed as having periodic catatonic schizophrenia, there were cyclical weight fluctuations; up to 9 lb. were lost in 24 hr. and regained in a few days. These periodic weight fluctuations were nearly always accompanied by a flare-up of the psychotic symptoms, the physical and the mental changes always bearing the same relationship in time in a given individual. Occasionally the weight fluctuated without mental change. No weight swings of this character were seen in a control patient with paranoid schizophrenia of constant chronicity. Treatment of two patients with chlorpromazine abolished the acute mental episodes and the weight fluctuations. Reasons are given for thinking that these weight fluctuations are the result of changes in body water and salt, and not of changes in eating or physical activity, and thus physical signs of a pathologic process underlying the mental illness. Previous metabolic studies of periodic catatonia used sodium-deficient diets which may have prevented the appearance of these weight fluctuations.

Treatment of Anemia of Kwashiorkor. The literature on anemia associated with kwashiorkor in young children has not shown that the hemoglobin improves under treatment with high-protein diets. In Mulago Hospital, Uganda, the hemoglobin content of the blood may occasionally deteriorate in children who are improving in every other respect on a high-protein, high-calorie diet. Seventeen young children with kwashiorkor were treated with injections of intramuscular iron and high-protein, high-calorie diets. Four were excluded from the inquiry. Of the remaining thirteen, ten of the eleven anemic patients responded promptly and well.

THE LICENTIATE

Vol. 7, June, 1957

* Infective hepatitis in general practice. S. Sankararaman and O. T. Cuddalore.—p. 91.

Infective Hepatitis. Infective hepatitis is a disease occurring generally in sporadic cases and in the form of small epidemics. The symptoms, differential diagnosis, prognosis, and treatment of this disease are reported. Infective hepatitis is caused by a virus with necrosis of the liver cells. Since there is no specific chemotherapeutic drug for the virus, treatment consists mainly of rest and diet. The diet should be rich in proteins and carbohydrates, but poor in fat. Since there is nausea and vomiting, the diet should be given in small quantities at frequent intervals. Since skim milk is not easily available in India, cream-removed milk is used. Dehydration, when present, must be combated by parenteral fluids such as glucose-saline. The administration of methionine and choline with the hope that these sulphur-containing amino acids may reduce the mortality and hasten recovery is not correlated with facts. Administration of vitamins is helpful. Vitamin A in daily doses of 25,000 units and 500-mg. tablets of ascorbic acid twice a day are usually prescribed. Crude liver and yeast tablets are also given. The remaining treatment is mostly symptomatic.

THE NEW ENGLAND JOURNAL OF MEDICINE

Vol. 257, August 8, 1957

* Incidence of megaloblastic anemia after subtotal gastrectomy. L. D. MacLean.—p. 262.

Megaloblastic Anemia in Subtotal Gastrectomy. By means of the absorption of radioactive vitamin B_{12} as an assay of intrinsic factor in patients who had undergone various types of subtotal gastrectomy, one patient was found who failed to absorb the vitamin. Microscopical examination of the resected portion of stomach in this patient revealed an extensive atrophy, with intestinalization of the mucosa and round-cell infiltration. It was also found that patients in whom megaloblastic anemia developed after subtotal gastrectomy (9 out of 1550 operated upon between 1938 and 1950 at one institution) showed the same characteristic changes in the previously resected portions of stomach. It is suggested that patients capable of producing adequate quantities of intrinsic factor when endowed with an intact stomach may be rendered deficient in this capacity if the stomach is subtotally resected. It is believed that patients likely to have megaloblastic anemia after subtotal gastrectomy can be predicted by microscopical examination of the resected portion of stomach.

NEW YORK STATE JOURNAL OF MEDICINE

Vol. 57, August 15, 1957

* Fats, cholesterol, and coronary heart disease. N. Jolliffe.—p. 2684.

Vol. 57, September 1, 1957, Part I

* The psychosomatic management of obesity. H. I. Kaplan, H. S. Kaplan, and H. L. Leder.—p. 2815.

Fats, Cholesterol, and Coronary Heart Disease. A review of the outstanding contributions regarding fats, cholesterol, and coronary heart disease is made. The next steps in transferring these results from the metabolism ward and formula diets are as follows: First, demonstrate by public health methods that if middle-aged males in their usual environment can be induced to modify their diets over a long period of time, their blood lipids, as measured by the cholesterol-lipoprotein system, will be favorably influenced. It has been proved that the blood lipids, as reflected in the cholesterol-lipoprotein system, can be altered in hospitalized subjects or in highly selected volunteers living on formula diets. It remains to be proved, however, that a significant number of persons free-living and consuming common American foods can be induced to modify their diet sufficiently to change their cholesterol-lipoprotein system over a long period. Second, demonstrate whether a favorable change in the cholesterol-lipoprotein system produced and maintained by diet is associated in fact with a favorable change in morbidity and mortality from coronary heart disease, particularly in men under sixty-five years of age. From present evidence, it seems not too optimistic to predict that this can be demonstrated within a few years. Moderation in all things is the best advice—a moderate but regular physical activity level and a moderate balance between work, recreation, and rest.

Psychosomatic Management of Obesity. The somatic and psychologic problems of obesity are discussed. The accepted view today is that the chief cause of obesity is an excessive caloric intake and a decreased energy expenditure. Overeating seems to be primarily psychogenically determined, although contributory genetic factors seem to be important. In the management of obesity, psychologic as well as dietary and medical factors must be considered. Initially in most cases the general practitioner may attempt management of both superficial emotional and medical problems. If he does not succeed, the psychiatrist should take over the psycho-therapeutic management and collaborate with the generalist in the total psychiatric-medical management of the patient. Psychologic contraindications to dieting should be observed as well as medical. Medical contraindications to stringent dieting, such as active tuberculosis, peptic ulcer, hepatitis, cirrhosis, regional ileitis, and ulcerative colitis, should be observed. Where indicated, appropriate diets which are calorically deficient may be devised for these illnesses. Coronary artery disease and hypertension should not be considered contraindications to weight reduction. Severe emotional disorders have at times been associated with reducing. Weight reduction may be dangerous, and care should be taken with any patient who has had a clinical depression. It would seem that the most acceptable total medical approach to obesity would consist of dietary control, an appetite-depressent drug, if desired a bulk-producing dietary medication, and possibly the use of diuretics.

NUTRITION REVIEWS

Vol. 15, September, 1957

* Calcium requirements. D. M. Hegsted.—p. 257.

* Water and life in the desert.—p. 258.

* Vitamin D in the newborn.—p. 262.

* The parotid glands and nutritional diseases. —p. 264.

Calcium Requirements. The revision of the Recommended Dietary Allowances of the Food and Nutrition Board in 1953 decreased the recommended allowance for calcium for adults from 1.0 to 0.8 gm., and slightly increased

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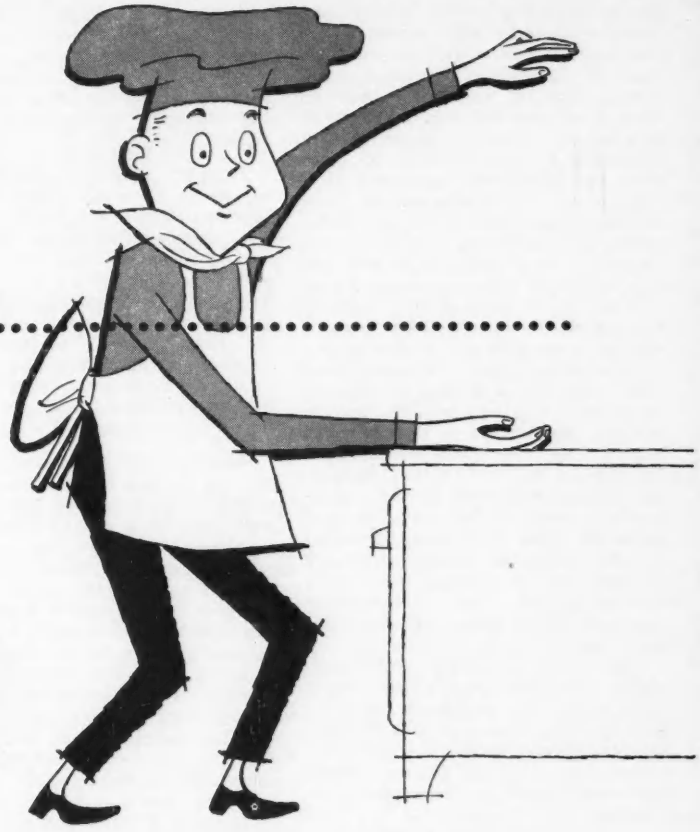

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the recommendation for adolescents. These allowances still appear to be far out of line with the evidence available and with everyday experience. Most of the world lives on diets which are not only very low in calcium, but have the apparently bad calcium-to-phosphorus ratio of 1:10. Still, the signs and symptoms of a dietary calcium deficiency in man remain undescribed. Nearly all of the evidence on which the allowances are based has been collected by the balance technique. However, maximum retention cannot necessarily be equated with desirable retention. The highest calcium requirements would appear to be during lactation. Osteomalacia, when reported, apparently responds to vitamin D therapy, but not to calcium therapy. It is thought that most women must be in strong negative balance during lactation. Women, like dairy cattle, must draw on their calcium stores during lactation and replenish them afterward. Increased intakes of calcium in the rat appear desirable, but at present, there is no way to translate these studies quantitatively for human beings. It is suggested from other rat studies that a lower level of calcium intake stimulates the parathyroids and keeps them active. The philosophy that the body should be loaded in case deficient periods appear may be completely wrong. There is need for more work and consideration of the upper limits of adequacy.

Water and Deserts. Water is the most important nutrient for survival. Study on the water requirements of men in desert areas was stimulated by the need for training troops during World War II for combat in North Africa. Since there are marked individual variations in caloric expenditure, the amount of water required to maintain normal hydration varies in different individuals, and in the same individual from day to day. The actual amount of water required to maintain normal hydration can be ascertained best by noting the amount of water required to maintain a normal or nearly normal urine volume. The only feasible way to economize on the water requirement is to reduce the need for sweating. Studies had been made on soldiers who were newcomers to the desert. To understand how the natives react to water needs, the tribesmen of the Eastern Desert in Egypt, one of the hottest areas in the world, were studied. The concentration of sodium chloride in the urine of the tribesmen was essentially the same as in the research workers, indicating that these natives were able to obtain enough water for their needs. The concentrations of nitrogen and potassium were greater in the urine of the research team. The tribesmen, by consuming a diet low in protein, were able to reduce urinary nitrogen excretion. They were well adapted to desert conditions and reduced to a minimum their need to dissipate heat by controlling their expenditure of energy. A high incidence of kidney stones is reported in some areas where water is short. However, the specific gravity of the urine of the tribesmen did not suggest any unusual concentration of the urine.

Vitamin D in the Newborn. In adults, it is assumed that vitamin D acts on the renal tubules as an antagonist to parathormone. This can explain the paradoxical effect of vitamin D in the newborn. A state of hypoparathyroidism of varying degrees of severity possibly exists during the first week or so after birth. Administration of vitamin D in the accepted therapeutic doses during this interval would tend to aggravate such a hypoparathyroid state.

Parotids and Disease. Although changes in the parotid glands associated with vitamin A deficiency are well established, enlargement in other nutritional diseases has not often received attention. Recently, painless bilateral parotid enlargement has been reported in association with alcoholism and liver cirrhosis. Although various authors have reported stigmata of different nutritional deficiencies in association with parotid enlargement, a single deficiency has not been incriminated and a heterogeneous group of nutritional inadequacies—caloric, protein, and vitamin—has been culled. The association of diabetes mellitus and obesity with painless parotid enlargement has also been noted. The association with nutritional deficiencies is reviewed in this paper. A nutritional component at fault is not identified, but protein is suspected.

PROCEEDINGS OF THE NUTRITION SOCIETY

Vol. 16, No. 2, 1957

* The breakdown of the water equilibrium in disease. D. A. K. Black.—p. 123.
* The restoration and maintenance of water equilibrium in disease. W. F. Young.—p. 128.
* Rapid gastric emptying time as a cause of crying in breast-fed babies. J. C. Yorston and F. E. Hytten.—p. vi.
* Social differentials in the heights and weights of Edinburgh school-children 1952-6. A preliminary communication. J. G. Thomson and W. N. Boog Watson.—p. vi.

Breakdown of Water Equilibrium. This article deals with primary water depletion and water excess. The causes, effects, and clinical recognition of these two conditions are outlined. These states are less common than the corresponding alterations in body water secondary to electrolyte depletion and excess. Clinical water depletion arises most commonly because of insufficient intake in patients who are comatose or lethargic. Inability to concentrate the urine adequately also predisposes to water depletion. The type of food intake is also of some importance. The oxidation of carbohydrate supplies an equivalent amount of water and oxidation of fat rather more. However, protein affords less water of oxidation, and the urea formed in protein catabolism requires water for its excretion. High-protein tube feedings in comatose patients can cause depletion of water. The most important factor in causing water excess is impairment of the diuretic response in certain diseases.

Restoration and Maintenance of Water Equilibrium. Early diagnosis of the diseases likely to cause dehydration can often be made. Knowledge of the proper use of water and electrolytes should be used for prevention rather than for treatment of a breakdown of water equilibrium. Unfortunately before it is realized, severe dehydration may be reached rapidly in very sick patients. The objects of treatment are to restore and maintain the volume and to repair the composition of the body fluids. Water and salt requirements must be assessed together. Methods of treatment are outlined, including that for infants and children and for children undergoing abdominal surgery. Experienced clinical appraisal throughout treatment is the keynote to success.

Crying in Breast-Fed Babies. The emptying time of the stomach was studied as a cause of crying. A group of breast-fed babies was selected who looked healthy and were gaining weight at the rate of 7 to 12 oz. weekly. These babies settled down temporarily after feeding, but woke early for the next feed, were restless, sucked their hands, and were ravenous at the breast. The clinical picture was described as "three-month colic." In all of them the symptoms of hunger disappeared with bottle feeding, and the babies seemed more satisfied. Barium sulphate was added to a bottle feed of one mother's breast milk. Under X-ray the mixture was seen to pass immediately into the duodenum and then rapidly through the jejunum; the whole feed was well down the small intestine within about 20 min. One week later, the experiment was repeated using a dried milk mixture. This passed normally through the pylorus after the usual interval, and there was still some barium in the stomach after 2 hr. Another colicky baby settled down on a dried milk mixture. The colicky crying and hunger recurred immediately when he was given breast milk again. It is suggested that some babies have a relative hypermotility of the gut and the fine curd of breast milk passes rapidly through the stomach, leaving it empty soon after feeding.

Social Differentials in Height and Weight. The heights and weights of Edinburgh school children were analyzed, according to the school attended for the years 1951-52 to 1955-56 and tabulated separately for each school, each age group, and each sex. The height and weight differentials between the thirteen-year-old boys of the school with the best five-year record and those with the worst was

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Nutritive Composition of Average Cereal Serving

	Cereal, 1 oz. Whole Milk, 4 oz. Sugar, 1 teaspoon	Cereal** 1 oz.	Whole Milk 4 oz.	Sugar 1 teaspoon
Calories	203	104	83	16
Protein	7.3 gm.	3.1 gm.	4.2 gm.	
Fat	5.3 gm.	0.6 gm.	4.7 gm.*	
Carbohydrate	32.2 gm.	22 gm.	6.0 gm.	4.2 gm.
Calcium	0.169 gm.	0.025 gm.	0.144 gm.	
Iron	1.5 mg.	1.4 mg.	0.1 mg.	
Vitamin A	195 I.U.	—	195 I.U.	
Thiamine	0.16 mg.	0.12 mg.	0.04 mg.	
Riboflavin	0.25 mg.	0.04 mg.	0.21 mg.	
Niacin	1.4 mg.	1.3 mg.	0.1 mg.	
Ascorbic Acid	1.5 mg.	—	1.5 mg.	
Cholesterol	16.4 mg.	0	16.4 mg.*	

*Nonfat (skim) milk, 4 oz., reduces the Fat value to 0.1 gm. and the Cholesterol value to 0.35 mg.

**Based on composite average of breakfast cereals on dry weight basis.

Bowes, A. deP., and Church, C. F.: Food Values of Portions Commonly Used. 8th ed. Philadelphia: A. deP. Bowes, 1956.
Cereal Institute, Inc.: The Nutritional Contribution of Breakfast Cereals. Chicago: Cereal Institute, Inc., 1956.
Hayes, O. B., and Rose, G. K.: Supplementary Food Composition Table. J. Am. Dietet. A. 33:26, 1957.

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approximately 2½ to 2¾ in. and 9 to 10 lb. In thirteen-year-old girls, the corresponding differential was 2¼ to 2½ in. and about 10 to 12 lb. Both boys and girls at five years of age showed a difference of 2 to 2¼ in. and about 5 lb. between the worst and the best. At 9 years, the difference is 3¼ to 3½ in. and 9 to 10 lb. Ignorance of food values and bad family budgeting and a background of unsatisfactory feeding habits in the community group are probably at least as important as economic factors and present a challenging problem for the health educator.

SCIENCE

Vol. 126, September 13, 1957

* Strontium-calcium movement from soil to man. C. L. Comar, R. S. Russell, and R. H. Wasserman.—p. 485.
* Rapid chemical changes in reconstituted dry milk. M. Keeney and R. Bassette.—p. 511.

Vol. 126, August 30, 1957

* Inhibition of cell division of *Escerichia coli* by low doses of ultraviolet light. R. A. Deering and R. B. Setlow.—p. 397.

Strontium-Calcium Movement from Soil to Man. The calcium reservoirs of the biosphere are becoming labeled to varying degrees with strontium-90 from nuclear weapons. These reservoirs include the human and animal skeleton, the milk, the vegetation, the upper layers of soil, and the waters. The degree of labeling is governed by the dilution that occurs, or the differential behavior of calcium and strontium in various steps of the food chain. This differential behavior normally provides a factor of protection against strontium-90 in the soil and vegetation that may be as high as 25 for the newborn and is most likely not less than 6 for adults, depending on food habits. The physiologic steps that are important in the movement of the two elements in the biosphere are described to provide a basis for an approach toward increase of the discrimination against strontium in favor of calcium. Some aspects of agricultural practices are discussed from this standpoint. The matter of hazard from levels now existing and the present need to undertake remedial measures are not discussed, in major part because of lack of experimental data on which to base such considerations.

Reconstituted Dry Milk. Recent study of certain chemical properties of reconstituted nonfat dry milk indicated a variability in analytic results which was correlated with the age of the reconstituted samples. Milk samples were analyzed for 5-hydroxymethylfurfural (MHF) and for indophenol-reducing substances. It was found that some rapid chemical changes were taking place in the freshly reconstituted instant milks. The changes in the non-instant milks appeared to be less pronounced and more variable. Furfurals and reductones are well known products of the browning reaction in foods containing sugar and protein. The higher levels of furfurals and reductones in the instant milks, as compared with the non-instant ones, indicate that the instantizing process used on these milks caused browning-type reactions to take place. Considering milk as a representative sugar-protein food, the foregoing manifestation may be encountered in many other dehydrated foods.

***E. coli* and Ultraviolet Light.** Ultraviolet light inhibits the cellular division of *E. coli* and causes the cells to grow into long filaments of about the same diameter as the normal cells, but as many times the normal length. The ultraviolet doses needed to inhibit the division of *E. coli* relative to those needed to alter appreciably other metabolic processes in the same strain were determined, and these results are given in a table. Even though the cells do not divide within at least 3 hr. after irradiation when grown at 37°C. in a specific medium, most of them apparently recover their ability to divide at a later time and give rise to a normal colony. The inhibition apparently is not permanent, but an extended division delay. The extent of recovery depends on the plating condition.

SCIENTIFIC MONTHLY

Vol. 85, September, 1957

* World population in relation to potential food supply. W. H. Leonard.—p. 113.

World Population and Food Supply. The present accelerated upsurge of population in the world cannot be disregarded without disaster. The trends predicted by Malthus are apparent today. The world population has more than quadrupled since 1650, but the average yields of food crops per unit area of land generally have been increased at a much lower rate. In the past, most measures used to cope with the food and population problem were stopgaps rather than ultimate solutions. The additional food needs were obtained largely from bringing more acres into cultivation. Mankind in overpopulated areas also shifted more and more to a nutritionally inadequate cereal and starchy root diet to meet his caloric requirements. He did little to control the rate of population increase. The potential areas of new land that can be brought into cultivation in the foreseeable future are definitely limited. Further efforts to increase food production from present cultivated land will be beset with many difficulties as upper yield limits per unit area of land are approached. At the current rate of population increase of 1.5 per cent per year, the limits of food production by conventional agricultural means are in sight. There are great potentialities for increased food production in the world through widespread application of improved agricultural practices now known. Somewhat more speculative are the possibilities for the conversion of inedible or waste materials into human food. Fulfillment of the objective of more food production will require a gradual shift from an agricultural to an increasingly industrial economy in nations where population presses on the food supply. It will also necessitate intensified research in all fields of science. It should be recognized that the theoretical possibility of a favorable balance between population and food requirements is much easier to outline than to attain in practice. The production of vast *Chlorella* farms, along with increased agricultural yields, might buy time in which the world could stabilize its population. Some measure of population control is necessary. Mankind ultimately must live within his resources or suffer the consequences of the controls imposed by nature.

ADULT EDUCATION

Vol. 7, Summer, 1957

* An attitude scale technique for evaluating meetings. R. P. Kropp and C. Verner. —p. 212.

An Attitude Scale Technique. One common element that appears to be measurable in regard to the success of an adult program is the general attitude of the participants at the end of the organized experience. An attitude scale, created along the basic lines set up by Thurstone and Chave, was used by the authors. The scale, constructed from the random opinions of sixty adults which were rated and categorized on an eleven-point scale by a group of seventy judges, was assembled by finding the mean rating of each statement as it was judged seventy times. A final scale consisting of twenty statements describing educational experiences in the most broad, general terms, was then set-up with the median value of each statement and the semi-interquartile range of each statement given. The questionnaire (without the above median information) was submitted to classes, and from the total of answers given by individuals, the mean rating of the class in general was found on the original scale. This was accomplished by adding the values of each attitude checked by students and dividing the total by the number of responses. The authors note that the scale measures only "attitudes in general," and is therefore not suitable as a device to evaluate content or to diagnose particular aspects of program design or management .

ADULT LEADERSHIP

Vol. 6, October, 1957

* Is the lecture obsolete? L. This.—p. 106

Lecture Notes. The author maintains that despite the recent abandonment of the lecture in favor of films, visual aids, round-table, and so on, the lecture is still a valuable tool for the dissemination of information. He recommends that the lecture be reexamined and that the examiner consider these points: (a) Face to face

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contact of lecturer with audience is an intrinsically exciting situation which cannot be duplicated mechanically. (b) A lecture is often the easiest way to get information across simply and economically. (c) Organization of the lecture, the abilities of the speaker, the subject, and the receptivity of the audience should all be ascertained before a lecturer is chosen. (d) The lecture is especially successful when used in conferences as a bridge between the agenda items which come before and after it. When planning a lecture for any group, don't forget such basic items as briefing the speaker on the listening group, possible group reactions, their grasp of the subject and their feelings, points you want covered, and a review of the general program so the lecturer can see how his part fits into the whole.

AMERICAN RESTAURANT MAGAZINE

Vol. 41, September, 1957

* Profit blueprints for modern restaurant operation. G. L. Wenzel.—p. 40.
* Advertising and promotion handbook.—p. 79.

Profit Blueprints. This article is the first in a series of ten "profit blueprints" for modern restaurant operation and gives details and points for all operators to make the most of their food service business. This initial blueprint discusses why customer turnover may be below capacity and the causes of low and high turnover. Some consideration is given to the relationship of seating capacity and sales. Factors that increase and decrease sales per waitress comprise the second big topic. Wage trends, the trend toward shorter work weeks, and the payroll problem are covered in the third part of the article.

Advertising and Promotion. This is a series of eight articles designed to form a handbook on advertising and promotion. The first article discusses ways to cut the cost of getting more business through newspaper advertising. The other articles which follow cover: how radio can produce results for restaurants; ways in which television advertising, programs, and press tie-ins emphasize restaurant specialties; how careful control can cut costs of direct mail; outdoor advertising; telephone menu service; how a restaurant can use greater interest in the community and its activities to promote more business; and merchandising aids, including a list of possible seasonal promotions.

DINER DRIVE-IN

Vol. 16, September, 1957

* Upgrading the dishwashing job. D. E. Lundberg.—p. 30.
* How conveyors cut corners.—p. 38.

Dishwashing. The theory of trying out workers until the operator finds one who is apparently satisfactory is widely used but not always successful. If adequate training and supervision are lacking on the job, the chances are great that the dishwasher will not work out well. In addition to good training and supervision, upgrading can set a more efficient pace in the diswashing-preparation areas. Set up all sanitation personnel into a classification called "utility personnel" and include in this group vegetable preparation people as well as kitchen porters, dish crew, and the pot-and-pan man. Train any of these people to do all the work involved, so that they can switch to different jobs when needed. Good points to remember if the operator wants more efficient workers who stay on the job: hire racially homogeneous groups; train bus boys to stack trays properly so that breakage can be reduced if not cut out; and pick a detergent salesman who will help train the warewashers and help maintain the machine.

Conveyors. The types of conveyors currently used in restaurants, both large and small, and institutions are: the one-way horizontal conveyors, two-way horizontal conveyors (a single belt, both sides of which are utilized) and the two-way horizontal conveyor. All are flexible and, when installed in a layout engineered to their maximum use, can pay for themselves in a short time. Advantages of conveyors are many. They relieve service personnel of much of the usual walking and waiting. Soiled dishes can be returned to the kitchen as soon as they are picked up. Traffic between the kitchen and dining room is almost eliminated. The central kitchen can handle remote service areas without need for long-distance foot traffic. Conveyors can also help supervise by setting the pace for serving and cleaning soiled dishes. The belts are equipped with safety switches that automatically stop them if the personnel do not keep up with them. As a merchandising attraction, the belts have distinct value and are useful in upping morale among employees.

FOOD ENGINEERING

Vol. 29, September, 1957

* Gaging the boom in rigid-foil packaging. J. V. Ziemba.—p. 80.
* Aluminum cans? . . . Here's what's cooking. R. J. Kelsey.—p. 106.
* New bacterial culture medium prevents cheese failures. S. Laverton.—p. 120.
* Cure-and-smoke process turns out improved-quality turkeys. H. R. Malcolm and J. G. Woodroff.—p. 121.

Rigid-Foil Packaging. Improved manufacturing techniques and speedier closing machines have cut over-all packaging costs to narrow the competitive gap between foil and non-foil containers. Because of this, new uses are moving at a gallop from development laboratories to the production stage. Foil containers command top consumer interest. Some foil packages have increased sales up to 300 per cent—without special advertising campaigns. Introduction of new colored foils has opened up further packaging possibilities. Convenience is another prime advantage. Pans for baking, roasting, oven-frying; trays, rigid-bottom pans, and hinged compartmented aluminum trays—all are time-savers for the consumer. Foil containers are now being handled well on automatic production lines, and today there are hundreds of foil containers in a variety of sizes, shapes, and gauges that can be closed with a wide choice of covers.

Aluminum Cans. This fall, three U.S. companies will market limited lines of light-weight aluminum containers. First on the market will probably be an impact-extruded aerosol. Excitement in this field is generated by the fact that for the first time, aluminum production has outstripped its market and producers are energetically looking for new ways to sop up the excess output. In addition, the can companies are irritated at the rising costs of tinplate and aluminum is a substitute, even though it is still high in price. The companies believe that with the incentive of mass production, prices will tumble. Aluminum offers some genuine advantages as a can-making metal from the standpoint of product protection, weight, printing, and merchandising appeal. Gathered together, these main reasons point the way to increased use of aluminum and are the generating sparks behind the drive to perfect techniques and cut production costs where the metal is used.

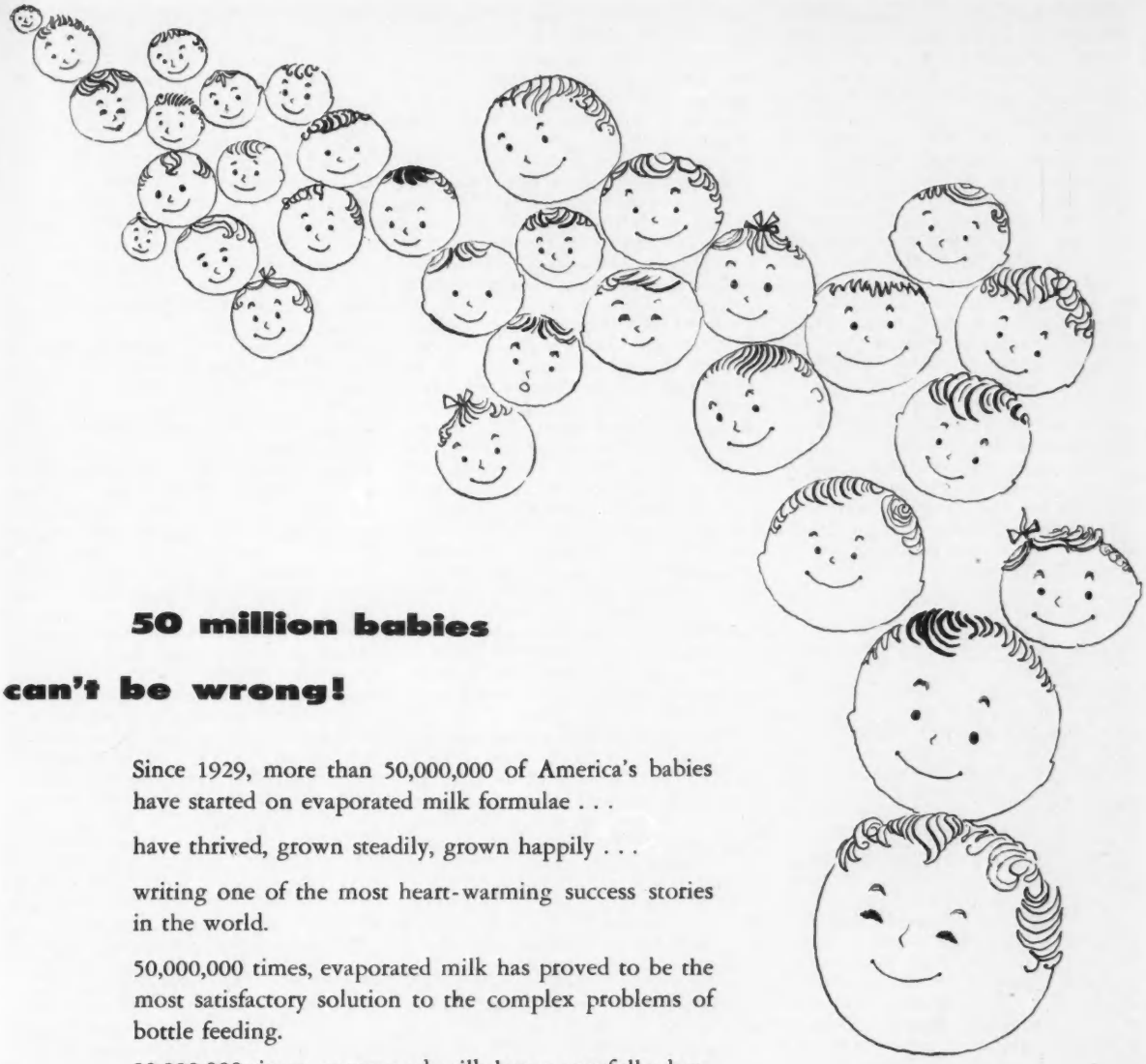
New Bacterial Culture Medium. The new Phage Resistant Medium (PRM), which is a calcium-free neutral medium produced from milk as a white spray powder, has proven effective in controlling phage and supporting starter bacteria. PRM will grow cultures that will make high quality cheese, even when bacteriophage contamination is heaviest. The neutral medium was discovered by Bruno Reiter in 1949 and was tested widely in factories in New Zealand and Australia. It is predicted that PRM will free cheese producers from many of the elaborate precautions now required in the effort to control phages which have caused losses running to 5 per cent of output in all major cheese-producing countries.

Cure-and-Smoke Processed Turkeys. The cure-and-smoke process extends storage life of the turkey beyond that of the frozen product. Cured-and-smoked birds have exceptional consumer appeal, according to the author of this informative article which gives the method of curing and smoking the birds, along with storage and holding data and weight factors. The author states that operations require a well-equipped dressing plant, curing facilities, smokehouse, walk-in cooler, and freezer.

HOSPITAL MANAGEMENT

Vol. 84, October, 1957

* Automation, centralization, production-line techniques. Pt. I. M. Tate.—p. 106.



50 million babies

can't be wrong!

Since 1929, more than 50,000,000 of America's babies have started on evaporated milk formulae . . .

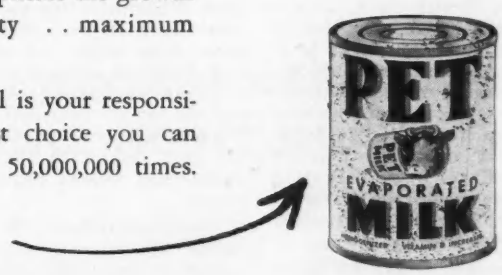
have thrived, grown steadily, grown happily . . .

writing one of the most heart-warming success stories in the world.

50,000,000 times, evaporated milk has proved to be the most satisfactory solution to the complex problems of bottle feeding.

50,000,000 times, evaporated milk has successfully demonstrated its combination of all the essential qualities . . . a level of protein sufficient to duplicate the growth effect of human milk . . . flexibility . . maximum nutritional value . . . and economy.

If the formula room in your hospital is your responsibility, evaporated milk is the wisest choice you can make. Evidence has shown that . . 50,000,000 times.



PET EVAPORATED MILK
is the "going home" formula for more babies than any other form of milk.

PET MILK COMPANY, ARCADE BUILDING, ST. LOUIS 1, MISSOURI

New Techniques Eliminate Cold Food. Detroit's Memorial Hospital spent months studying its food service problem and set out to reorganize production facilities. The reorganization program set up a timetable for needed changes. A pilot study to determine the hospital's dietary needs was conducted. As reorganization got underway, automation, centralization, and production-line techniques were incorporated into a separate cold food assembly line. The centralized hot food service area was blocked out in the main kitchen. Cafeteria entrances and exits were rerouted. Job descriptions were written for employees on each job, and classes were held for some ninety workers to indoctrinate them. A timetable of deliveries for integration with other departments using hospital corridors and elevators was worked out, and a food truck system was put into operation. When the program was completed and evaluated, total net gains in convenience and improved service were marked.

HOSPITALS

Vol. 31, September 1, 1957

* Kosher dinners on call. L. Wilkonson.—p. 76.
* Use of microwave ovens with raw foods. V. G. Hart.—p. 78.

Vol. 31, September 16, 1957

* How Shreveport trained its own food service supervisors. F. O. Hazzard.—p. 72.

Vol. 31, October 1, 1957

* New findings in food preparation. P. J. Aldrich.—p. 72.

Kosher Dinners on Call. In recent years pre-prepared frozen kosher dinners have been introduced on the market for Jewish patients who follow the kosher food laws in their homes and would prefer to do so as patients. Recognizing the need for observance of the dietary laws for the hospitalized Jewish person, Michael Reese Hospital in Chicago instituted the service of frozen kosher dinners for patients in August 1956. Although approximately 50 per cent of the patients admitted to the hospital are of the Jewish faith, only a few request kosher dinners (about 10 per day in the 900-bed institution). The distributor in Chicago makes five varieties of kosher meals available to the hospital. Prior to the service, the dinners are heated for 20 to 25 min. in a 450° F. oven. The patients can order the dinner by so indicating on the selective menu. No charge is made for this service, and patient acceptance is good.

Using Microwave Ovens for Raw Foods. A local utility company loaned a microwave oven to the Stormont-Vail Hospital, Topeka, Kansas. The oven was installed in the kitchen and used in routine work with the conveyor belt. Pyrex, china, earthenware, paper, and plastic dishes (tray service dishes) were used as containers for cooking the foods, since microwaves will not penetrate metal. As the raw foods were cooked in the oven, a record was kept of the type of food, the amount, the cooking time, and the results. Due to the short cooking time, late requests for a baked potato could be filled. Fruits and vegetables had a fresher flavor than those cooked on top of the stove. Foods could be cooked and served in the same container. Flavors did not mix when more than one kind of food was cooked at the same time. The oven was excellent for heating frozen, precooked foods, and foods served immediately after reheating were in excellent condition. Little heat was given off from the oven and it was easy to clean. The cooking time increased as the amount of food increased. Liquids refrigerated in individual serving bowls would be heated satisfactorily, but the containers remained cool during cooking. Heat was transferred from liquid to bowl before the food would be served. It was felt, however, that the cost of the oven was too great for its restricted use. Most of the meat products were drab in color. Some products became too dry in the cooking. However, with proper planning for space in food preparation, assembling plates of food, and freezer storage, the microwave oven could be of value in reheating frozen, precooked foods for either central or decentralized food service.

Training Food Service Supervisors. The author discusses the development, content, and results of a six-week evening course for food service supervisors in Shreveport, Louisiana. Sponsored by the Shreveport Dietetic Association, this course prepared forty-two dietary assistants to serve in local hospitals, nursing homes, and food establishments. Classes, including study of organization and management, nutrition and diet therapy, and supervisory and job training technique, made up the 24-hr. course which ran two nights a week for 2 hr. over a six-week period. At the end of the course, examinations were given and the class graduated. Fact sheets giving advance information on the lectures were passed out in each class, eliminating the need of student note-taking. It was found that students were eager and receptive and that their attention as a group was strong. Evidence that they were learning showed up long before examinations, and there was no doubt that the food service in the institutions where they worked increased in efficiency.

Food Preparation. The author discusses new food preparation techniques, products, and equipment that have been developed in food research laboratories. Application of these findings in the hospital can lead to better food for patients and more efficient food production. New processes described include: the use of tailored recipes; new equipment and packing for portion planning; and use of new steam and pressurized equipment. Research news includes discovery of new mixing methods for pudding, pie fillings, and salad dressings; new ways to make meringues; modern techniques for handling sponge cakes and jelly rolls, dried beans, potatoes, dried eggs, and dried milk. The author predicts that greatest advances in food service and institutional cookery will come after managers have the courage to perform the final rites for the old-fashioned philosophy on which they are so often tempted to fall back—"the way we've always done it!"

INPLANT FOOD MANAGEMENT

Vol. 4, September, 1957

* Plan the congestion out of your system with a shopping center cafeteria.—p. 22.
* A statistical look at the inplant field.—p. 42.

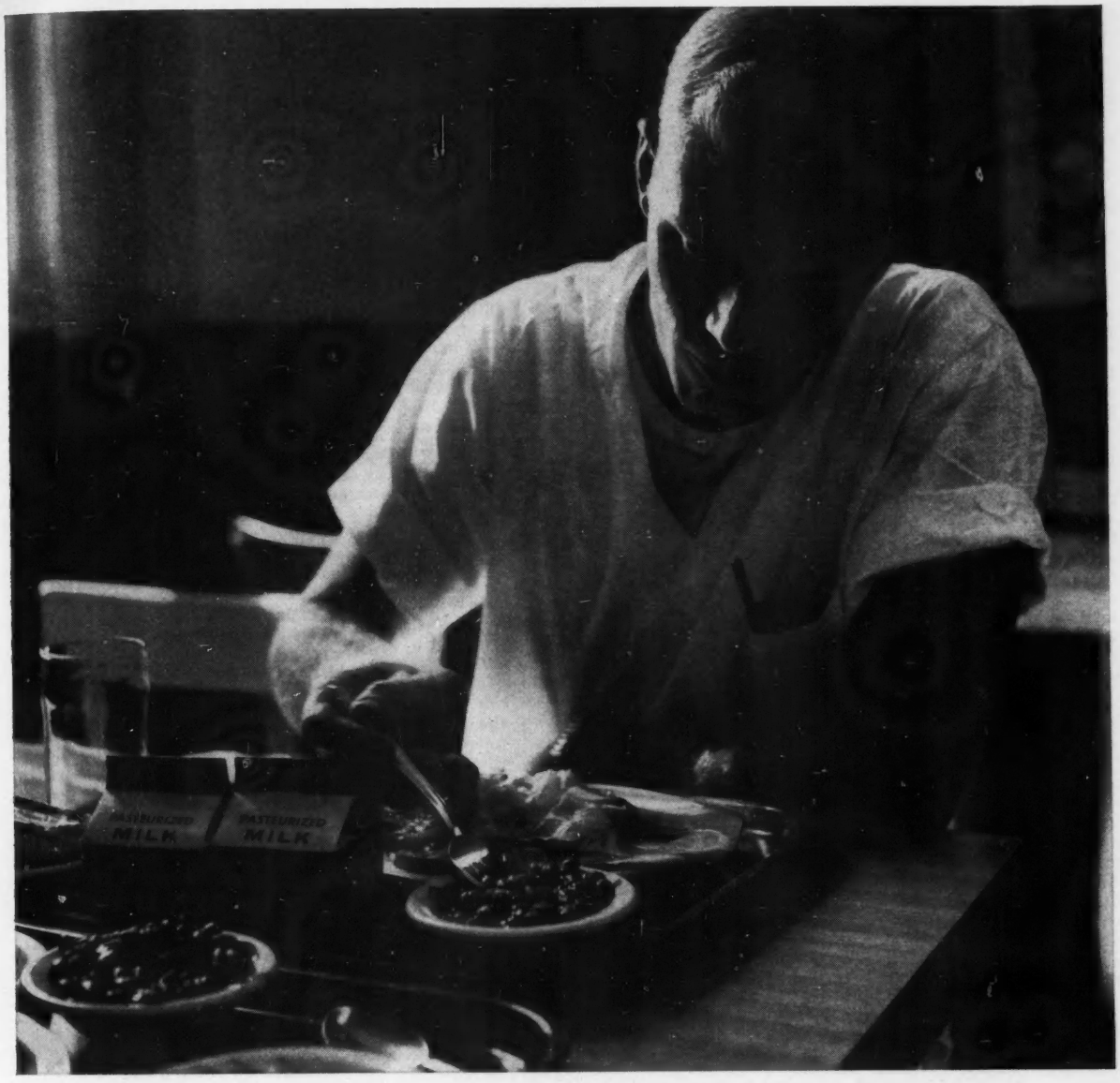
Plan for a Shopping-Center Cafeteria. The shopping-center arrangement is more efficient than the single-line system in dispersing traffic quickly in the inplant cafeteria, according to the experience of Bell Telephone Laboratories, Whippany, New Jersey, in operating a new cafeteria. The design of the hollow square, with effectively placed serving sections on three sides, encourages patrons to move freely from section to section without waiting for the entire line to move. Properly arranged food sections permit the quick-lunch customers to pick up self-service items and pass into the dining room without feeling that they are being delayed, or delaying the patrons wishing complete meals. The Bell report includes considerations of labor-saving devices, safety factors, location, construction, food preparation areas, operating equipment, storage facilities, bottlenecks, cash station problems, self-service, special equipment, and dishwashing. The report on the shopping-center inplant cafeteria is completed with recommendations on dining room layout.

Statistical Review of Inplant Field. Two thousand inplant operations were surveyed for the answers to questions most frequently asked of the editors. Questions ranged from building activity to the price of soft drinks. The charts and graphs published are designed to help the operator use the statistics and to determine trade practices, evaluate his position and policy, and plan his future activities along the lines most followed by other people in the field.

INSTITUTIONAL FEEDING AND HOUSING

Vol. 9, September, 1957

* Frozen portion-packed entrées cut school feeding costs.—p. 16.
* Making midshipmen salad conscious at low cost.—p. 28.
* How to build breakfast traffic. E. C. Blair.—p. 40.
* How to buy apples.—p. 42.
* Food warmers: keep food hot, keep food fresh.—p. 50.
* Are your restrooms up to par?—p. 60.
* New school trains service employees.—p. 66.
* Sanitation for food handling personnel. B. Donaldson.—p. 86.



It's easy to control costs and end waste with Heinz Beans because you open only as many tins as you need

POPULAR HIGH PROTEIN SIDE DISH
3½¢ PER SERVING: HEINZ BEANS

From the nutritional viewpoint alone, you couldn't get a better buy than Heinz Beans. They're high in protein, low in cost. A four-ounce serving costs only 3½¢. What other protein food can you buy—ready to eat, with all the preparation and cooking done for you—for under 14¢ a pound? Just as important, of course—everybody *likes* Heinz Beans. The 54-ounce Chef-Size tin makes cost control simple. Cuts labor costs, too. Just heat and serve. There's no waste, no leftovers. Order Heinz Beans on your Heinz Man's next call.

HEINZ
CHEF 57 SIZE
BEANS

YOU KNOW IT'S GOOD BECAUSE IT'S *HEINZ*

H. J. HEINZ COMPANY • Hotel and Restaurant Division

Frozen Entrées Cut School Costs. Public schools in Chicago are now successfully serving pre-cooked packaged lunches. The pre-cooked packets make it possible to serve a wide variety of Type A hot school lunches with a minimum expenditure for equipment and labor. The participating schools are equipped with freezers large enough to hold a week's supply. Some fourteen items have been developed in test kitchens where testers make sure each 8-oz. portion contains all the required taste and nutritional values. Standardized recipes are used; seasoning is worked out in detail. A large cafeteria kitchen in one of the high schools is used as the central kitchen where the foods are cooked, packaged, and frozen before distribution to participating schools.

Salads for Midshipmen. The first dietitian to serve the Naval Academy was faced with the problem of making midshipmen salad and dessert conscious. Traditionally meat-and-potatoes men, it was felt that the aversion many of the men had for beneficial greens and fruits could be corrected. Salads developed by the dietitian are given in this article. They proved to be popular as did her lemon meringue pie which cut costs on each pie 7 cents.

Building Breakfast Traffic. At breakfast time it's necessary to provide patrons with the particular "extra" they may be seeking. This may be extra speed, service, variety, flavor, food value, or economy. To bring breakfast to life, consider the many different ways of serving fruits and fruit juices, breakfast sandwiches, cereals with toppings, hot breads, sweet rolls, pancakes, and waffles. Eggs fit into every breakfast and suggestions for their preparation are given, as are others pertaining to all the breakfast components.

Apple Buying. Buy Rome Beauties and Stayman Winesap apples for baking. For fresh apple pies, buy Transparent, Wealthy, Winter Banana, Pippins, Rhode Island Greening, Grimes Golden, Northern Spy, Jonathan, Stayman Winesap, York Imperial, and Gravenstein, in medium size. Buy Michigan and eastern apples rather than California and northwestern varieties in frozen pack; they have more flavor. Do not accept discolored or brown apples, either in the fresh or frozen state. Fresh sliced pack is not recommended for pies, as many varieties are mixed together and cooking times are uneven. The eye is a faithful guide to quality; good apples are fresh skinned and fresh looking.

Food Warmers. Food warmers range in size from infra-red lamps to mammoth hot food serving tables. They heat by various means—electricity, steam, gas, or canned heat. Some warmers are equipped with humidity controls; some have special water pans that can be inserted when moisture is desired. A short catalogue of warming equipment is given in this article. Models are described, and factors to be considered in selecting equipment are given.

Restrooms. Often, more money than thought goes into a restroom installation. By designing for minimal upkeep and by making restrooms handsome enough to earn the respect of their users, the cost of maintaining such facilities can be greatly reduced. Some of the following tips will help in these respects. Use colored wall, floor, and fixture combinations. Be sure to provide good lighting, air conditioning exhaust fans, and windows. Install sound-absorbing materials in the ceilings. Provide ash trays or sand urns and a receptacle with swinging lids for paper towel disposal. Avoid self-closing faucets on wash basins. Install wall-hung urinals at various heights for the use of adults and children. Be sure latches, hinges, door bumpers, coathooks, and any other restroom objects are so designed that they cannot be broken or stolen. Design partitions and doors to withstand weight and abuse. In women's rooms, place mirrors on a free or end wall away from basins. Provide convenient shelves beneath the mirrors. Install women's toilets with large outlets and forceful blowout flushing action. Provide, also, covered waste receptacles and purse-and-package racks in each toilet compartment.

Training for Service Employees. Adult education classes have been set up by the Board of Education in San Francisco to teach courses in beginning service, advanced service, wine service, room and banquet service, and cafeteria and counter carving. School sessions are four months long, with three sessions each year. Experienced professional waiters instruct at the school which uses actual foods in meat carving and serving classes. No fees are charged the students who, it is hoped, will supply the increasing demand for skilled waiters in the area.

Sanitation. To be sure that employees are following sanitation rules, management should see that certain facilities, equipment, and supplies necessary for maintaining sanitation are provided. Restrooms with showers and locker space and a good supply of clean uniforms and aprons will make it easier for personnel to maintain personal hygiene. Use printed instructions liberally. Signs and posters should be put up to remind employees to wash their hands regularly. Since signs cannot do the job alone, personal supervision is another way of seeing that good sanitation practices are carried out. Classes on the premises, conducted during working hours, often get results. Explanation of health ordinances, simplified explanation of communicable diseases and their transmission will do much to keep employees aware of sanitation and its importance.

INSTITUTIONS

Vol. 41, October, 1957

* What the aged need as patrons; their potentialities as personnel. W. T. Donahue.—p. 9.
* Vending.—p. 35.
* Health code for vending places new emphasis on sanitation. H. Beitel.—p. 42.
* Expert gives tips on how to improve cafeteria operation. deA. Upton and E. S. Barton.—p. 59.

The Aged—Potentialities, Needs. The aged have special needs—social, physical, and psychologic. In a question-and-answer session published in this article, the author discusses these needs and comes to some conclusions: dietary needs of the aged are the same as for a normal adult with this difference—elderly people need less food and need to eat more often. An ideal solution to public eating for the aged would be the restaurant operated as an European coffee house where patrons could spend as much time as they wished with their friends. Housing for the aged tends to include medical facilities for the sick as well as housing for well persons. This means that well persons are constantly exposed to the psychologically depressing atmosphere of a hospital. It is recommended that facilities for the elderly be separated—with healthy residents put on their own in communal buildings. Hotels offer a solution for the aged as they are usually centrally located and no household responsibility falls on the older resident. Workers should retire at the age of sixty-five. The author believes a complete break at that time is the best way to make a transition to leisure. It may be painful, but offers fewer problems in the long run than the gradual retirement plan. Before retirement and approaching old age, the worker generally needs more encouragement in trying new things or accepting new ideas. But, it is maintained that older workers have higher morale on the job and are capable of doing skilled work that does not require a rapid pace.

Vending. In this article, a summary of the advances and prospects for the vending machine business are given. It is noted that the industry is concentrating on many new products and working to erase the old objections to their machines: inappropriate styling, faulty operation, lack of service, poor sanitation; low food quality control, and lack of patronage acceptance. The vending machine business has increased from $1 million in 1925 to a $2 billion venture in the '50s. It is predicted that vending machines will do $5 billion in business by 1965. This prediction is based on the fact that more and more hotels, businesses, plants, and hospitals are using machines to dispense hot foods as a supplement to food service on the premises or to supply demand exclusively.

Vending Sanitation. A recommended ordinance and sanitation code for vending machines was drafted

For Speedier Return To Normal Nutrition

Meat...

and the Protein Need in Renal Disease

Prevailing opinion holds that during the nephrotic state—provided the kidneys are capable of excreting nitrogen in a normal manner—the patient should be given a diet high in protein (1.5 to 2 grams per kilogram of body weight daily). The purpose of such a diet is to replace depleted plasma protein and to increase the colloidal osmotic pressure of the blood.

Sharp restriction of dietary salt appears indicated only in the presence of edema, but moderate restriction is usually recommended.

Lean meat is admirably suited for the diets prescribed in most forms of renal disease. It supplies relatively large amounts of high quality protein and only small amounts of sodium and chloride. Each 100 Gm. of unsalted cooked lean meat (except brined or smoked types) provides approximately 30 Gm. of protein, and only about 100 mg. of sodium and 75 mg. of chloride.

In addition to its nutritional contributions meat fulfills another advantageous purpose: It helps make meals attractive and tasty for the patient who must rigidly adhere to a restricted dietary regimen.

The nutritional statements made in this advertisement have been reviewed by the Council on Foods and Nutrition of the American Medical Association and found consistent with current authoritative medical opinion.

American Meat Institute
Main Office, Chicago... Members Throughout the United States

this summer by U.S. Public Health Service at the request of the National Automatic Merchandising Association. The code and ordinance recommendations provide sanitation standards for all machines and particularly for machines vending perishable foods. The measure includes these requirements: perishable foods must be vended at temperatures above 150° F. if hot, and below 50° F. if cold; each machine storing perishable foods must be equipped with automatic controls that will shut the machine off and keep it out of operation if the temperature varies. Parts of machines which come into contact with readily perishable foods must be removed daily and sanitized at the operator's commissary. Bulk milk machines must vend milk from containers filled at dairies and may not be refilled on location. Machine locations must be free of overhead leakage, pipes, and drains and must be tightly fitted to prevent insect and rodent infestation. Multi-use can openers must be cleaned and exchanged frequently and be reasonably free from manual contact. Other sections of the new sanitation code deal with adulteration and misbranding, cleanliness of servicing personnel, inspection procedures, and administrative materials.

Improved Cafeteria Operation. The authors provide tips for sound management in this article. Recommendations include: give the public what it wants on the menu—don't do the unusual thing; don't overbuy—consider spoilage before buying large quantities; and, keep employee morale up. In regard to employees, the author also recommends thorough training for the best possible service and customer acceptance. Courtesy and service are pointed out as the two most desired qualities in an industrial operation where the food service manager must please customers and plant management as well.

THE MODERN HOSPITAL

Vol. 89, October, 1957

* The kitchen was built for microwave cooking. E. R. Park and E. D. Ibata.—p. 108.

Microwave Kitchen. Food service is planned around the use of microwave ovens at the new 58-bed Kaiser Foundation Hospital, Harbor City, California. Over-all space allocated to the operation is considerably less than required by conventional operations. The microwave system involves a certain amount of precooking in the form of blanching for vegetables and browning for meats. Microwave ovens, a small electric range, and a small high-compression steam pressure cooker are used in the precooking of meat and poultry items, vegetables, and potatoes. Items may be precooked the day before serving, or as long as two weeks before consumption. Refrigeration or freezing follows precooking. Meals are assembled on plastic-coated paper plates and covered with a transparent hood. These plates are then processed through the microwave ovens just prior to being transported to the patients. Cooking is completed on the plate in a matter of 50 seconds. The total time needed to assemble plates, process them through the microwave ovens, deliver them to patients is not more than 1 hr. 30 min. for any one meal. The microwave system permits the unhurried assembling of portions on plates, allows good portion control, and results in less waste food. Savings on raw food are about 25 per cent.

NATIONAL RESTAURANT NEWS

Vol. 1, September, 1957

* Ruffley speaking on food and equipment. J. J. Ruffley.—p. 10.

Purchasing Meat. This is a discussion of points which may interest restaurant operators concerned with the purchasing of meat. Meat supplies are usually largest in the fall and winter and smallest in the spring and summer. Prices follow seasonal ups and downs. Production of meat is larger and smaller depending on the number of livestock slaughtered. Production follows a regular seasonal pattern dependent on supply. This general production is adjusted by movement in and out of cold storage which in turn allows, for example, the stabilization of beef consumption to 10 per cent above average in October and 10 per cent below average in February with remaining months stable. Consumption of commercially produced pork is considerably greater in the fall and winter than at any other season. Largest supplies of lamb and mutton appear in the fall and winter months. The supply of veal on the market is usually greatest in the summer and early fall. The U.S.D.A.'s Agricultural Marketing Service keeps a close check on availability of food supplies, including meats, and issues information obtainable by operators.

PERSONNEL JOURNAL

Vol. 36, September, 1957

* Inference and prediction as communication barriers. W. M. Sattler.—p. 140.

Communication Barriers. When speech is heavily loaded with inference, chances are it will be ignored. Information crusted with inference may be worthless in itself, but more often it is of some value. To avoid losing this "value," inference in communication should be lowered to a point where facts can predominate. The use of value-judgments, stigmatic symbols, and interperative inferences should be decidedly limited. When inference in speech is reduced, hostility in the listener is also reduced. Correspondingly, the message becomes more listenable. Where hackneyed expressions, predictable phrasing, old ideas are used by the speaker, the listener develops a "prediction complex" which allows him to hear without listening. To avoid this boring situation, the speaker should treat the listener with something unusual, not something predictable. Vital information and employee moral are both affected by the use of unpredictable phrasing. In the first case, the information is actually communicated, and in the second, attention given to a message that has real meaning and is not simply a management cliche strengthens respect for management.

SCHOOL LUNCH JOURNAL

Vol. 11, September, 1957

* Audrey—and school lunch.—p. 12.
* Here's how to select your dishwashing machine. E. M. Cushman.—p. 14.
* The need for adult education. Mrs. A. Horn.—p. 43.

Disaster Role of School Lunchrooms. The experience of the Lake Charles, Louisiana area in the face of the disaster—hurricane "Audrey" this summer—points up a lesson to be pondered over by all school lunch people. When this hard-hit community was faced with the problem of providing meals and shelter for a thousand children and adults, the school became the center of survival. During the frightening days of the hurricane, Clarice Taylor and volunteers used the school facilities to cook for the refugees from the storm. When the storm was over, the superintendent of schools and the principal of the Lake Charles High School agreed that a clear-cut area of authority must be worked out with the Red Cross and Civil Defense agencies and the role of the school system during disaster determined. It was pointed out by the school authorities that school buildings are among the first used during emergency survival. The school lunchroom and kitchen, the supplies in the storeroom, and the experienced and trained school lunch staff provide a vital combination of first importance in any emergency. On the basis of the Lake Charles experience, it was recommended that every school board sit down with the representatives of community disaster agencies and plan ahead for any natural disruption that might entail the use of school facilities for mass feeding.

Dishwashing Machines. To figure the correct size of a dishwashing machine for a school lunch program, it is recommended that the buyer compute the potential maximum meal load for the complete Type A lunch at 75 per cent of the elementary school enrollment exclusive of kindergarten and 50 per cent of the secondary school enrollment. The type and size of dishes and trays to be used has a direct bearing on the proper size of dishwashing machines. The 9-in. plate is preferred and indicates the use of a machine with 20 by 20 in. dish racks. The correct size of spray-type machine (where hot water and detergent as well as rinse water are pumped through spray heads over dishes that are placed in racks for the washing process) is the size which permits processing all racks required in a period of time no longer than the serving time, or no longer than 2 hr.

There is a special message for you in these POLAR WARE stainless steel Perforated Pans

Here are pans for steam cooking . . . and in appearance much like any other that is standard for the purpose. But because they're Polar Ware, you'll find these pans are different.

PERFORMANCE is their special forte. Because they are deep drawn in one piece of heavy gauge stainless steel these pans are seamless and durable to the point of indestructability. They have built-in stamina to deliver years of service . . . make your small investment perhaps the most enduring value your money can buy.

Ask the men who call on you about these three great performers — available in 2½", 4" and 6" depth, all with rounded corners. You'll find the best houses carry Polar Ware.

Polar Ware Co. *4100 LAKE SHORE ROAD SHEBOYGAN, WISCONSIN

Merchandise Mart — Chicago 54 Room 1455 | *123 S. Santa Fe Ave. Los Angeles 12, California | *415 Lexington Ave. New York 17, N. Y. | Offices in Other Principal Cities *Designates office and warehouse

Above all...

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Because Custom French Onion Soup is so carefully prepared and its ingredients are so well-balanced, it is an excellent source of flavor for such dishes as liver and onions, for onion sauces and gravies, or for any other recipe that calls for these rich, nourishing onions with the appetite-stimulating taste.

For all of these uses, Custom French Onion Soup is astonishingly easy to prepare. Moreover, it is so concentrated in flavor, that it is surprisingly economical—especially when you consider its quality. Your Custom jobber can give you many hints on how to use this versatile base. Ask him today.

Custom FOOD PRODUCTS, INC.
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Engineering data sheets which list the capacity of each machine in terms of racks per hour are issued by manufacturers and will aid the buyer in selecting the proper size. In deciding on construction, consider only heavy gauge stainless steel. All valves and scrap trays should be of corrosive resistant metal. Types of machines varying upward in capacity and cost are: the single tank, hood type; the single-tank, door type; single tank, automatic conveyor; and, the two-tank, automatic conveyor.

Adult Education. Adults, especially mothers of growing children, need to know what the human body requires daily, how to prepare food to save its nutritive value, and how to make food attractive enough for their families to enjoy it. These facts were brought out forcibly by a recent survey which showed that of twenty-one pupils questioned on the food they ate in a two-day period, only one had eaten well balanced meals at home.

WHAT'S NEW IN HOME ECONOMICS

Vol. 21, October, 1957

* Let's talk about fats.—p. 76.

Fats. This article comes to certain conclusions drawn from a wealth of scientific information about the place of fat in the normal diet. These conclusions are: (a) There is a real need to relate the story of fat in the diet "from the minds of men to the lives of people." (b) Fats do belong in the everyday diet. (c) It is vitally important that home economists and nutritionists continue to emphasize the healthful, balanced, adequate diet, with its wide variety of types of foods. (d) The well chosen diet should contain sufficient amounts of all nutritive essentials, and it is extremely unlikely that such a varied diet would contain excessively undesirable amounts of any one nutritive factor. (e) At present, there are no conclusive findings which indicate a need for altering the established concept of man's basic nutrition needs and of the constituents of an adequate diet, including fat. (f) It is more important to obtain a balance of nutrients in the diet for maintenance of a good nutritional state than to concern oneself with restriction of a single food substance, such as fat. In a discussion of the fat content of meat and other protein foods, the article suggests that moderation in the dietary intake of total fat is a good general nutrition practice; recommended intake of about 25 to 35 per cent of total calories in fat amply allows for normal dietary intake of beef, lamb, veal, pork, poultry, and fish with their usual content of naturally occurring fat. It was also suggested that high levels of good-quality protein have a protective effect against elevation of blood cholesterol when high levels of fat are fed. Milk is recommended as a good food to keep protein intake at a desirable level.

Result: A hardy, handsome, all-inclusive place setting to answer every food service need, including economy!

Turning *to* the wonders of electronics helps The Man With the Lily Plan turn *up* novel ideas in paper service design, construction, handling. Here he studies facts and figures showing consumer preferences in kinds of foods and sizes of portions — preferences that will be part of Lily's thinking whenever a new cup, container or plate reaches the blueprint stage.

Probing and investigation of this type are standard operating procedure at Lily*. It leads to innovations like the Lily Place Setting, now meeting with great success in every industry and institutions where complete meals are served. From the perfect-fit tray cover to tiny creamer, Lily created the ideal size and shape cup, container and plate for everything from appetizer to, and through, dessert. Lily created a mood, too, for this is a cheery, bright, matched service that enhances the appeal of food and drink.

Best of all, Lily created a workable way to serve smartly, quickly, safely — *at low cost*. This place setting ends costly scraping, washing, and storing of plates, cups, glasses, bowls. Ends breakage and replacement costs, too! Service is swift, light! Clean-up time is cut to the bone! And many foods can be pre-prepared in slack periods.

*T.M. Reg. U.S. Pat. Off.

Naturally you'll want more concrete information. We've anticipated some of your questions and have the answers plus a FREE Sample Place Setting Kit. Write us at *Lily-Tulip Cup Corporation, Dept. JADA-12, 122 E. 42nd St., N.Y. 17, N.Y.*

lily cups

Dr. Maynard Made Honorary Member of A.D.A. The election of Dr. Leonard A. Maynard as an honorary member of The American Dietetic Association was announced at the Annual Banquet of the Association in Miami Beach on October 24. Dr. Maynard, who is Professor Emeritus at Cornell University, was elected to membership "in recognition of his outstanding contributions to nutrition and dietetics:

As a *talented original investigator* in animal nutrition and agricultural chemistry;

As an *inspiring teacher* of many of our leading men and women in nutrition;

As a *gifted author* whose writings express his clean and concise thinking and his catholic interests in the whole field of nutrition;

As an *able and unselfish administrator*, always concerned with the personal and professional development of those under his guidance; and

As a *tireless public servant* concerned with the utilization of the scientific knowledge of food and nutrition for the promotion of human welfare *and* in appreciation of his:

Recognition of the role of the dietitian and nutritionist;

Interest and enthusiasm in helping to promote nutrition programs, whether education, research, or policy-making;

Thought-provoking contributions at local, state, and national dietetic meetings, and

Services as Scientific Advisor to The American Dietetic Association."

Dietitians Honored. *Major Mary Lipscomb*, AMSC, director of dietetic intern training, Brook Army Hospital, Fort Sam Houston, Texas, was recently awarded a Certificate of Achievement prior to her transfer to the Fifth Army Headquarters, Chicago, where she will serve as procurement officer for the AMSC.

An honor of a different type has come to *Jelia Vandervort*, former teaching dietitian at St. Luke's Hospital, Cleveland. Prior to her resignation to take up graduate work, the nursing students of St. Luke's dedicated their yearbook to Mrs. Vandervort.

Dietetics Institute. The American Hospital Association will present an Institute on Dietary Department Administration in Dallas, January 20 to 24. Topics to be covered will include:

"Fundamentals of Administration"
"Administration in Action"
"Employees Are People"
"Techniques of Supervision"
"How I Share Supervision"
"How I Train Supervisors"
"Management Communicates"
"Budget Planning—A Tool of Management"
"Factors Affecting Costs"
"Planning a Work Simplification Program"
"New Food Products—Factors Affecting Layout and Equipment"
"Building Public Relations"

The following foods are expected to be in plentiful supply during December, according to the U.S.D.A.:

Protein foods

Almonds
Chickens—broilers and fryers
Filberts
Pork
Turkeys

Other foods

Apples
Cranberries
Dates
Grapefruit
Oranges
Pears, winter
Peas—canned and frozen

Symposium. On October 22 and 23, a "Symposium on the Mode of Action of Lipotropic Factors in Nutrition" was conducted at the University of Pittsburgh's Graduate School of Public Health. Topics on the program included:

"Biosynthesis of Choline and Betaine"
"Role of Choline in the Hepatic Oxidation of Fat"
"Role of Choline in the Turnover of Phospholipid"
"Nutritional Fatty Liver in Rats"
"Choline and Methionine Antagonists in Metabolism"
"The Renal Lesion in Choline Deficiency"
"Vascular Disease Associated with Choline Deficiency in the Rat"
"Fatty Liver in Man and the Role of Lipotropic Factors"
"Fatty Liver in Children—Kwashiorkor"
"Effect of Low-Protein Diets on Serum Lipids in Man"
"Effect of Lipotropic Factors upon Serum Lipids and Vascular Disease in Man"

Workshop on Nutrition for Nurses. On November 8 and 9, several St. Louis dietitians participated in a workshop on nutrition sponsored by the Saint Louis Industrial Nurses' Association in cooperation with the Dairy Council of St. Louis and Missouri Division of Health. The workshop was given as in-service training for the industrial nurses in the area who are assuming new and enlarged roles as health counsellors to the employees in the plants they serve. The headline speakers on the program included the following dietitians: Mary Reeves, Regional Nutrition Consultant, U.S. Children's Bureau, Chicago; Marie Harrington, Dairy Council of St. Louis; Ruth Brennan, Nutritionist, St. Louis County Health Department; and Evelyn Carter, Dietary Consultant, Missouri Division of Health. The topics covered included: "Nutrition Facts Versus Fads Today"; "Family Food Budgeting"; and "Special Diets—How the Nurse Can Help Interpret Them to the Family."

Nutrition for the Layman. With its October issue, *Today's Health* began a series of twelve articles on "Food and Health," designed to give readers the essence of what modern science knows about nutrition in readable, usable form. The first article, "Today's Knowledge of Nutrition," was contributed by E. V. McCollum, Ph.D., Professor Emeritus of Biochemistry, Johns Hopkins University, Baltimore.

In November, Hazel M. Hauck, Ph.D., Cornell University, prepared a discussion of "Food for Energy" as the second article in the series.

Booklet on Health Quackery. The Boston Better Business Bureau has recently revised its *FACTS You Should Know about Health Quackery*. It is one of a series of FACT booklets designed to aid consumers in their everyday money-management problems and relations with business.

There is forthright condemnation of those preparations or "treatments" which are dangerous, or worthless, or offered for conditions for which they do not constitute competent treatment and where unwise self-treatment may permit the condition to progress so far that the damage cannot be repaired. No condemnation of self-medication is found in the booklet; on the contrary, it points out that the use of reliable drugs, marketed by reputable manufacturers for simple ailments and for temporary relief of symptoms is generally a safe procedure. The booklet features informative paragraphs on alcoholism, arthritis, cancer, obesity, pep pills, and stomach ulcers, among other subjects.

Free copies may be obtained by professional persons by writing to the National Better Business Bureau, Inc., Chrysler Building, New York 17.

American Board of Nutrition. The next examinations for certification as Specialist in Human Nutrition will be held under the sponsorship of the American Board of Nutrition during the week of April 13 to 19, 1958, in Philadelphia. Candidates who wish to

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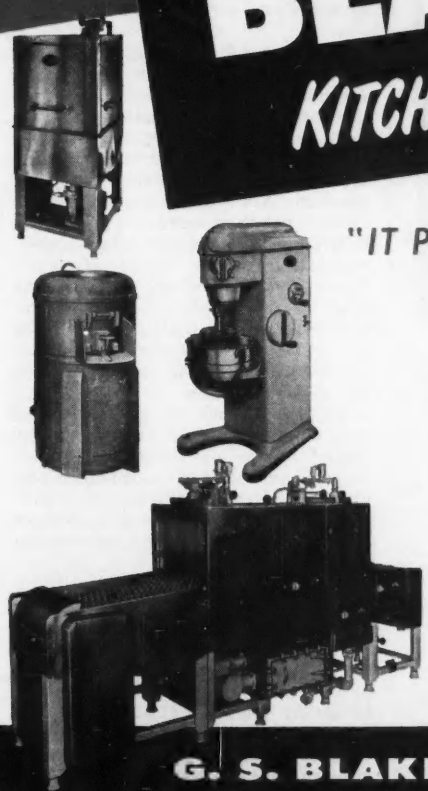

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be considered for these examinations should forward applications not later than March 1 to the Secretary, Dr. Otto O. Bessey, Environmental Protection Research Division, Quartermaster Research and Development Center, Natick, Massachusetts.

Publication on Fats. To clear up some of the facts concerning dietary fats, the Institute of Shortening and Edible Oils, Inc., has issued a booklet, *The Chemistry of Food Fats and Oils*, which answers the questions most frequently raised on this subject. Its principal sections cover the following topics: what is a fat? classification of fatty acids; isomerism of unsaturated fatty acids; saturated and unsaturated fats and oils; molecular configurations and properties of glycerides and fatty acids; oxidation of fats; polymerization; hydrogenation of fats; molecular rearrangement; and minor components of fats. The booklet is indexed. Copies may be obtained from the Institute, 1145 Nineteenth Street, N. W., Washington 6, D.C.

Report on Frozen Foods. "Amino Acids in Nine Frozen Vegetables" is the title of a reprint from the *Journal of Agricultural and Food Chemistry* which is being distributed free by the National Association of Frozen Food Packers, 1415 K Street, N. W., Washington 5, D.C. The article gives figures for ten amino acids in terms of: per gram of total nitrogen and also per 100 gm. product. The following vegetables are considered: baby Lima beans, Fordhook Lima beans, broccoli spears, Brussels sprouts, collard greens, cut corn, black-eyed peas, green sweet peas, and French fried potatoes.

Enforcement of FDA Regulations. In September, the Food and Drug Administration took its first step in a new program to obtain better compliance with the bread standards and to prevent exaggerated claims for breads when it filed an injunction against Continental Baking Company charging misbranding in the labeling of its "Wonder" and "County Fair" buttermilk breads. It was claimed that these products purport to be enriched bread and contain nitrated flour, an additive not permitted by the enriched bread standards. A temporary restraining order was subsequently issued by the Federal Court for the District of Columbia enjoining the company from distributing these products in interstate commerce.

The Food and Drug Administration is urging bakers across the nation to review their bread formulas and labels in the light of this order.

A later release at the end of October indicates that more than thirty bakeries have already told the FDA that they intend to change their labels to eliminate possibly misleading references to "buttermilk" as an ingredient of white and enriched bread.

Food Label Declaration. Food packers will be required to start listing ingredients on the labels of several additional food products within the next year. These foods had been exempted from the labeling requirements of the 1938 Food, Drug, and Cosmetic Act because it was expected at the time that standards would soon be established. The new action applies to certain canned packs of fruits, berries, and vegetables; canned clams, fish, roe, and shrimp; lemon and orange extracts; malted milk; olives in brine; and sauerkraut. Packers are allowed one year to use up existing stocks of labels.

The Food and Drug Administration is continuing the original exemptions for three classes of food: frozen desserts, nonalcoholic carbonated beverages, and vanilla extract. Standards for these items are being worked on by the Food Standards Committee of the agency.

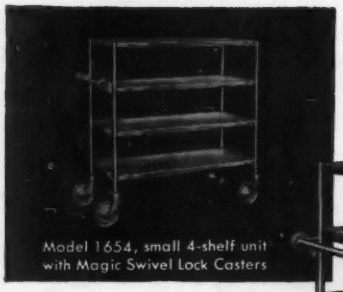
Defense Guides for Food Facilities. A bulletin, *Defense-Guides for Commercial Food Facilities*, has been prepared by the Food and Materials Requirements Division, Commodity Stabilization Service, U.S. Department of Agriculture. Issued as a guidebook, it discusses factors for reducing the vulnerability of food facilities to attack or other enemy action. Sugges-

Another important addition to the J & J line of popular food service trucks

NEW J&J tubular

Frame Tray Trucks

Now available in the two basic sizes illustrated and in 4 or 5-shelf models. All types furnished in either stainless steel or standard painted finish.



Model 1654, small 4-shelf unit with Magic Swivel Lock Casters

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Model	1654–1655 (small size)	2654–2655 (large size)
Shelf Size	19¾" x 43¾"	23½" x 51½"
Shelf Clearance	(1654) 10¼" (1655) 7⅞"	(2654) 10¼" (2655) 7⅞"
Casters	*8" double ball bearing	*8" double ball bearing

*Customer is offered choice of 2—8" swivel and 2—8" stationary casters or 4 swivel casters with one caster at each end equipped with magic swivel lock. Either choice at no extra charge. Bumper handles and continuous rubber bumpers supplied at slight extra cost.

Smooth . . . from Start to Finish

Here's quality from every viewpoint; from the smoothly rolling 8" double ball bearing casters to the smoothly finished shelves and uprights. No rough edges, no sharp corners. Shelves are welded to uprights and then ground smooth. Shelf edges are turned down with center panel recessed. Tops of all uprights are covered by chrome plated plug buttons. Yes, they're designed throughout for smooth performance and long life. Order yours today.

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tions are given for continuity of management and production and for plant civil defense organization. The guidebook was developed primarily for use in the field of food processing and wholesale distribution and is available from the Government Printing Office, Washington 25, for 10 cents each.

Nebraska Nutrition Study. To be used in cooperative extension work in agriculture and home economics, *Food Practices and Nutritional Status of Typical Nebraska Families* is a report of observations made on 46 Nebraska families with 246 members. The study was made by Ruth M. Leverton and Jean Pazur: to determine the need for a nutrition education program in the state, to determine the particular aspects of food practices which need to be improved, and to add to the data which are being accumulated by similar studies of population groups in the U.S. The booklet includes details of procedure, results, bibliography, and charts and tables explaining the various phases of the study. The report is Miscellaneous Publication 5 of the Agricultural Experiment Station, The University of Nebraska College of Agriculture, Lincoln.

Postdoctoral Awards in Statistics. Awards for study in statistics by persons whose primary field is not statistics but one of the physical, biological, or social sciences to which statistics can be applied are offered by the Department of Statistics of the University of Chicago. The awards range from $3600 to $5000 on the basis of an eleven-month residence. The closing date for application for the academic year 1958-59 is February 15, 1958. Further information may be obtained from the Department of Statistics, Eckhart Hall, University of Chicago, Chicago 37, Illinois.

Film. From the *Fish and Wildlife Service* comes an announcement of a new 16 mm. sound-color film (running time, 14 min.), "Sardines from Maine —Down-east Style." The picture was financed by the Maine Sardine Council and was produced by the Bureau of Commercial Fisheries of the Fish and Wildlife Service. The new film will supplement "It's the Maine Sardine" produced nine years ago. The new picture is "down-east" in every detail, from brief scenes of the taking of fish from the cool Maine waters through a whole series of tried-and-true Maine recipes being prepared and served. The picture is primarily directed to the homemaker to show her the many ways the sardine can be used. Free distribution will be done by the Bureau of Commercial Fisheries through a film library system. Further information may be obtained from the Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, Department of the Interior, Washington 25, D.C.

Social Security for Women. With the 1956 Amendments to the Social Security Act, certain changes were made in the provisions relating to women. Reduced benefits at age sixty-two for some women were made possible. This, and other rights for women under the act, are explained in a pamphlet entitled "Benefits for Women under the 1956 Amendments to the Social Security Law" which has been issued by the Social Security Administration of the U.S. Department of Health, Education, and Welfare. An even fuller explanation of the importance of social security for women is available in the Women's Bureau (U.S. Department of Labor) publication, "Women and Social Security." Both pamphlets may be obtained by writing to the issuing agencies in Washington, D.C.

Apple Color. The brighter the color of red varieties of apples, the greater their sales appeal on the fresh market, according to the studies at the West Virginia Experiment Station. However, it costs more to produce well reddened apples and it's almost impossible to produce a crop of apples all of which are highly colored. Tryouts in nine stores in two West Virginia cities were made on two lots of Rome Beauty apples, packaged in 5-lb. transparent bags. The apples were similar except for color. One lot

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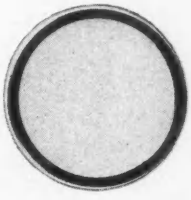
Don't throw money away on broken dishes!

A west coast restaurant using ordinary china had replacement costs totaling $216,376 for a seven-year period . . . $30,911 a year. Then the owner changed to PMC melamine dinnerware.



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Here's new beauty and strength . . . strength that makes this melamine dinnerware hard to chip, crack or break. De Luxe Regal Ware is made by an exclusive "color-on-color" process of bonding two colors into a single piece. Each piece has the self-draining contour base and heavy duty rolled edges. For more information about money-saving De Luxe Regal Ware, write:

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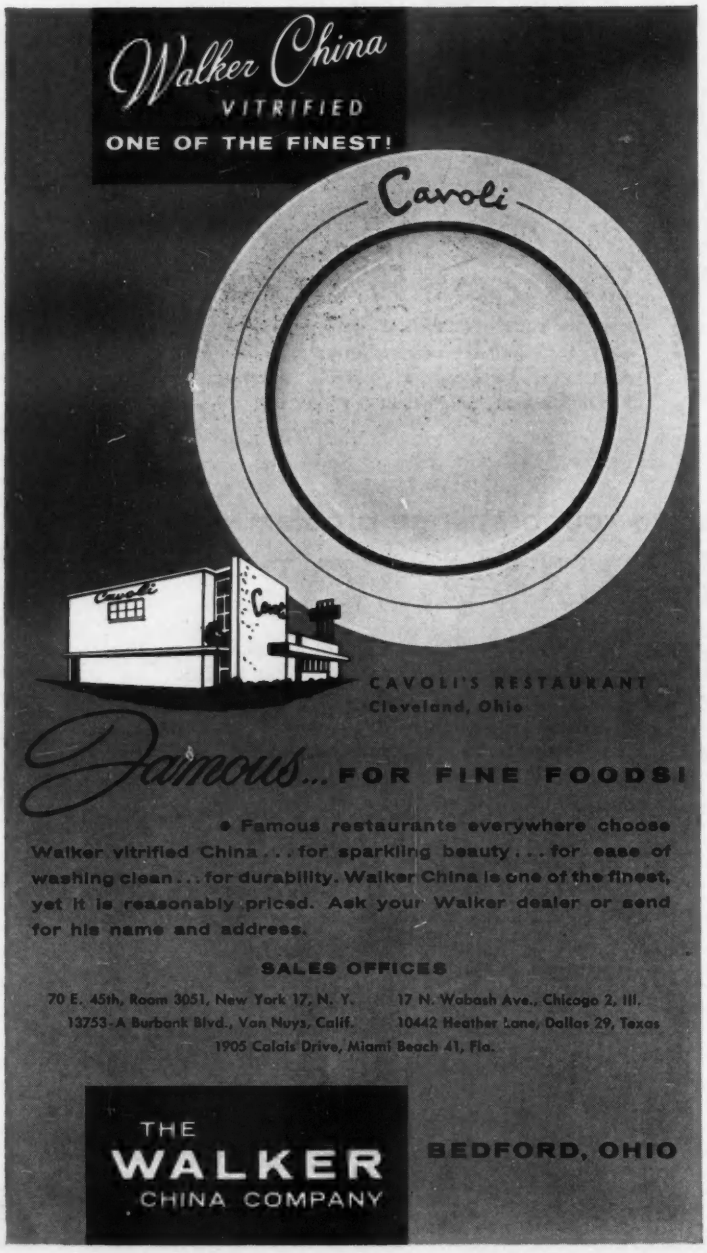
Also available in solid and textured colors, and in decorated patterns.

had only about 15 per cent red color; the other about 50 per cent, enough to qualify as U.S. Extra Fancy grade. Shoppers chose the red apples almost four to one. Interestingly enough, sales were a third less when only the red apples were offered, though the price was the same. Apparently the contrast in color helped the sale of the redder apples. On the other hand, when the price of the red apples was raised 4 cents a pound, or 20 cents for a 5-lb. bag, sales fell markedly.

Peanut Flavor. The North Carolina Experiment Station reports that peanuts which contain considerable moisture when they are picked are likely to have an off-flavor when they are cured (dried). Peanuts need rapid but cool drying. If they are dried with heated air which doesn't provide enough oxygen, organic acids or alcohols are produced which give the poor flavor. The next step in research is to develop a practical method of rapid but cool drying that can be used along with the peanut harvester now being developed that digs and also picks green peanuts in one trip through the field.

New Dairy Product. Modified sweetened cream is a new product developed by Arjen Tamsma and Raymond Bell of the U.S.D.A.'s Eastern Utilization Research and Development Division. The cream's biggest potential use is in ice cream manufacture, replacing the frozen cream or other source of milk fat now used. It whips into a light, frothy topping for fruit, cakes, and pies. It could be used in candy, pastries, other baked goods, cake icings, and flavored drinks; or, it could be diluted for a single source of cream and sugar for coffee and cereals in homes and restaurants and on camping trips. The product lends itself to use by the armed forces and on planes and ships—wherever refrigeration is lacking. Fat content is approximately five times that of sweetened condensed milk and twice that of coffee cream; it contains about 40 per cent fat, 30 per cent sugar, 20 per cent water, and 10 per cent nonfat milk solids.

For best storage, sweetened cream should be packed in sealed tin cans or glass jars. So far, it has been successfully stored for six months at 70° F. After opening, the cream lasts a week or more at room temperature. Research is still under way on the viscosity, color, flavor changes at various storage temperatures, and shelf life. Application for a public service patent has been made.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News of State Associations

Alabama Dietetic Association. Alabama dietitians met November 8 and 9 at Alabama College, Montevallo. The program included:

"Are We Eating Too Much Fat?"—a symposium

"Selling Our Profession"—Mrs. J. L. Suydam

"You and Your Human Relations"—Minnie Miles

"Recent Developments in Laboratory Testing"—Dr. Thomas S. Hosty

"An Opportunity for Service—The Seale Harris Diabetic Camp"—Ruth Azar, VA Hospital, Montgomery.

Arizona Dietetic Association. December 6 and 7 are the dates of the 16th annual convention of the Arizona Dietetic Association in Phoenix. The program includes:

"Let's Use All of the Dietitian's Talents"—Dorothy Taylor

"Dietetics in France and the United States"—Jessie M. Rannels, Ph.D.

"How to Conduct a Workshop"—Mildred Weigley Wood, Ll.D.

"Nutritional Problems in Central Nervous System Disease"—John F. Eisenbeiss, M.D.

"New Oral Hypoglycemic Agents—Their Role in Nutrition"—Woodson C. Young, M.D.

"How We Can Make Nutrition Education More Effective"—a panel concerned with teen-agers, geriatric patients, hospital in- and outpatients, and students and interns.

Plan <u>now</u> for the big season ahead

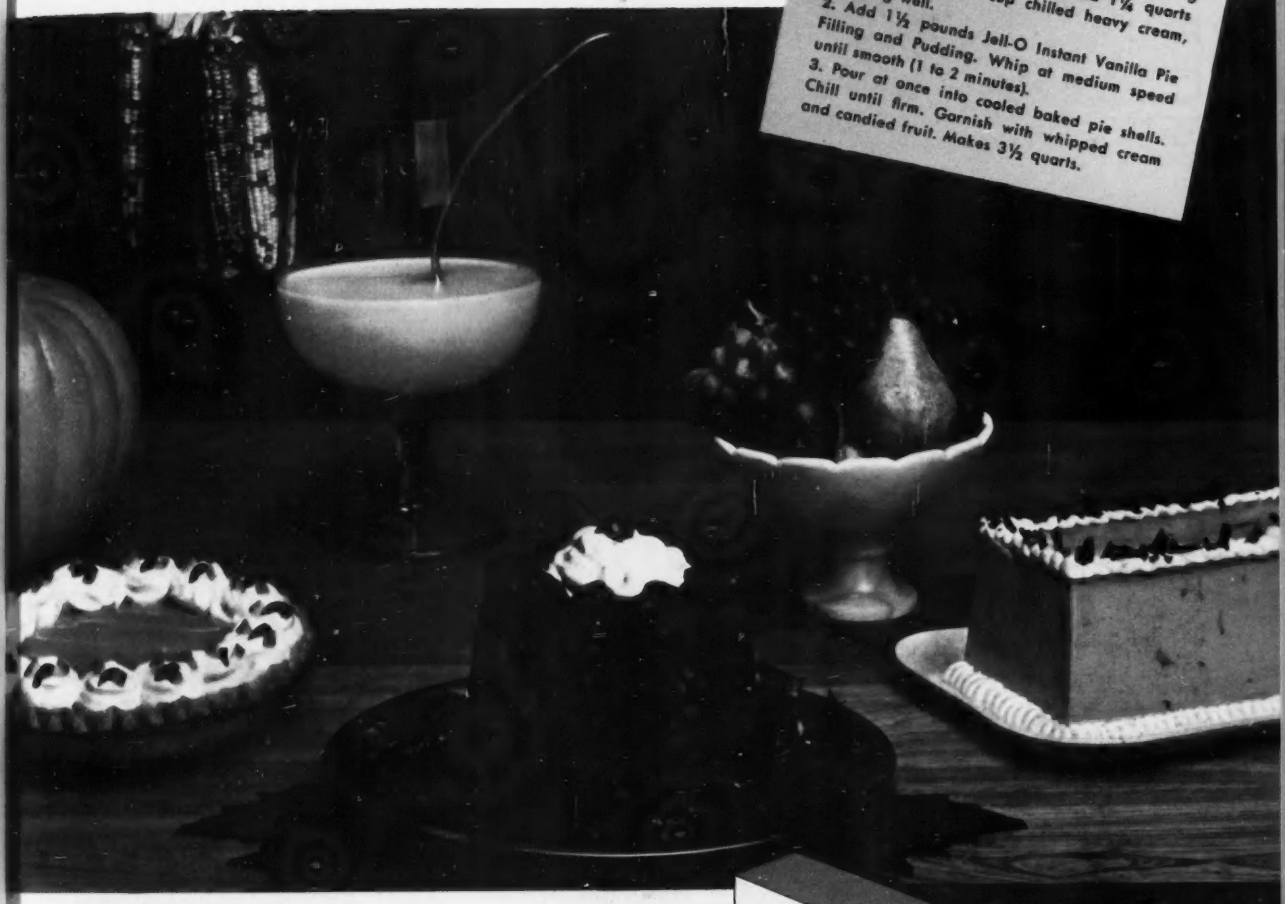
HIGH-PROFIT JELL-O DESSERTS

idea:

CREAMY PUMPKIN PIE

Filling ready to pour in less than 5 minutes . . . no baking!

1. Combine in mixer bowl: 1½ quarts pumpkin, 4 teaspoons cinnamon, 2 teaspoons <u>each</u> nutmeg and ginger, 1 teaspoon salt. Add 1¼ quarts chilled milk and 1 cup chilled heavy cream, blending well.
2. Add 1½ pounds Jell-O Instant Vanilla Pie Filling and Pudding. Whip at medium speed until smooth (1 to 2 minutes).
3. Pour at once into cooled baked pie shells. Chill until firm. Garnish with whipped cream and candied fruit. Makes 3½ quarts.



Festive days ahead mean higher profits for you! Plan right now for those holiday desserts your customers *expect* to find on your menu—right through the season! With low-cost Jell-O Products, you can serve a premium-priced selection that will tempt any appetite. For instance, the items above: festive plum pudding, creamy sherry sauce, frosty pistachio-almond crème loaf, and easy-to-mix pumpkin pie. All so simple with Jell-O Gelatins and Jell-O cooked and instant Pie Fillings and Puddings! And all so profitable! For these and other recipes, write General Foods Institutional Kitchens, White Plains, N. Y.

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11

Georgia Dietetic Association. The 24th annual fall meeting of the Georgia Dietetic Association was held November 8 in Atlanta. An interesting program included a report by Dr. Maude Pye Hood, Head, Department of Foods and Nutrition, University of Georgia, Athens, of her recent experiences in working in Pakistan. Dr. J. Gordon Barrow, Director, Heart Disease Control Program, Georgia Department of Public Health, spoke on "The Relationship of Diet to Heart Disease," informing members of Georgia's research program in heart disease control. "Communications as a Tool of Management" was discussed by Paul H. Anderson, Chief, Personnel Division, VA Hospital, Atlanta.

Indiana Dietetic Association. On November 7, the Indiana Dietetic Association met in Evansville at the Mead Johnson & Company offices. Following a tour of the company, a dinner and business meeting was held.

Officers for 1957-58 are: President, Fern Gable, Ft. Wayne; President-Elect, Mary Myers, Muncie; Secretary, Miriam Eads, Lafayette; and Treasurer, Ruth McDannold, Bloomington.

Iowa Dietetic Association. Ames was the scene of the fall meeting of the Iowa Dietetic Association on November 12. Theme of the meeting was "Let's Be Ready for the New!" The program included:

"Eliminate Those Barnacles" (relating to public relations)—Verne R. Martin, former General Sales Manager, Maytag Company, Newton, Iowa

"Let's Focus on Food"—Virginia Heffington, *Better Homes and Gardens* Magazine, Des Moines

"Dietary Consideration in the Treatment of Phenylketonuria and Galactosemia"—Dr. C. H. Reed, Pediatric Department, State University of Iowa Hospital, Iowa City

"Problems Associated with Fats in the Diet"—Wilma Brewer, Ph.D., Food and Nutrition Department, Iowa State College, Ames

"Your Bright Tomorrow" — Fern Gleiser, School of Business Administration, University of Chicago

Massachusetts Dietetic Association. The 1957-58 season of the Massachusetts Association opened on a new note this year with a reception for dietetic interns and new members held by the Executive Board on September 12. The reception was a part of the get-acquainted program for newcomers.

The first meeting of the Association took place on September 24 at Simmons College. Past-President Helen MacDonald introduced the new officers: President, Miriam Connelly; President-Elect, Marion Cronan; Secretary, Marjorie Healy; Treasurer, Anne Hurevitz. Guest speaker, J. Roger Deas, Public Relations Department, American Can Company, ad-

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most likely mealtime has become a distasteful chore instead of a delightful duty. You can often encourage a stubborn eater to stay with your diet by offering wider food variety—more palatable menus. Gerber's 5 Cereals, over 80 Strained and Junior (minced) Foods give you greater latitude in making substitutions for "picky" eaters. Specially processed to preserve true colors and tempting flavors—reduce crude fiber to a minimum.

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Choose your favorite flavor and send us the coupon below. We'll send you *absolutely free* a sample (makes 8 servings) of your favorite flavor and a booklet of complete information about *Jullicum*. We guarantee that *Jullicum* will be your friend for life.

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dressed the group on the "Role of Women."

In October the regular monthly meeting was held at a plant of the Boston Edison Company where members were guests at a professional cookery profit clinic after a dinner meeting. The program was devoted to the use of cut frozen meats and the methods and techniques of the latest developments in meat cookery. A color film was shown entitled: "Controlling Costs with Portion Cuts of Meat" produced by Swift and Company in cooperation with the National Restaurant Association.

The Carney Hospital was host for the November meeting at which the delegates reported from the A.D.A. Annual Meeting in Miami.

A diabetic detection and instruction campaign for the city of Boston and surrounding areas once again was sponsored by the New England Diabetes Association on November 18 and 19. The Community Nutrition Section of the Massachusetts Dietetic Association worked with dietitians of the Boston area in presenting exhibits, demonstrations, and panel discussions as aids for the diabetic person. This year emphasis was placed on the exchange system for planning diets.

Michigan Dietetic Association. The fall meeting of the Michigan Dietetic Association was held November 8 at the Grace A. Dow Memorial Library, Midland. The program included:

"Nutrition and Coronary Heart Disease"—Zoe Anderson, Ph.D., National Dairy Council, Chicago

"Management of Diabetes with Orinase"—W. K. Allen, The Upjohn Company, Kalamazoo

"Report on the Course for Hospital Food Service Supervisors"—Margaret Gillam, Michigan State University, East Lansing

"Amino Acids and Their Metabolism" —Dr. Edgar C. Britton, Dow Corning Company, Midland.

New Jersey Dietetic Association. November 6 was the date of the annual meeting of the New Jersey Dieteic Association held in Princeton. This was the twenty-fifth anniversary of this group. The program included:

"Pre-Testing Nurses"—a panel discussion

"A New Approach to the Essentials of an Adequate Diet"—Louise Page, U.S. Department of Agriculture, Washington

"Antibiotics for the Maintenance of the Freshness of Perishable Foods" —Dr. Paul Hopper, Food Industry Development, American Cyanamid Company, New York

"Tomorrow's Challenge Today" — Edith Jones, National Institutes of Health, Bethesda, Maryland

On November 21, New Jersey dietitians held a joint meeting with the New Jersey Hospital Association in Newark. The program included a report on consultant surveys and aids for Connecticut hospital dietary departments by Jane Hartman, A.D.A. Chairman of the Committee to Study the Food Service Supervisor. "What Constitutes a Well Organized Dietary Department from the Administrator's Viewpoint?" was discussed by Warren G. Ranier, Director, Mountainside Hospital, Montclair.

Winner of the 1957 Dubois scholarship of the New Jersey Dietetic Association is Bonnie Amerman, a graduate of Douglass College, Rutgers University. Miss Amerman is now an intern at the State University of Iowa Hospital, Iowa City.

Officers for 1957-58 of the New Jersey Association are: President, Mary E. Warmuth, Presbyterian Hospital, Newark; President-Elect, Irma Walker, St. Mary's Hospital, Passaic; Secretary, Frances Ditulio, Cranford; and Treasurer, Marian Maltese, St. Joseph's Hospital, Paterson.

South Dakota Dietetic Association. The eighth annual meeting of the South Dakota Dietetic Association was held in Mitchell on November 8 and 9. The program included a report on mass feeding in time of disaster by Sister M. Dorothy; a report of a conference on dietary department management by Evelyn Hollen; and an address by Dr. W. Peiper on ulcer problems as viewed by the radiologist.

Association Activities

New A.D.A. Council Members. Two newly elected Council Members—Delegates of the House of Delegates—are: Virginia Harger, The Ohio State University, Columbus, and Dr. Charlotte M. Young, Cornell University, Ithaca, New York. Miss Harger is also the new Secretary of the Council.

A.D.A. Representatives. Ruth Dickie, as A.D.A. representative, attended the South Dakota Dietetic Association meeting in Mitchell, November 8 and 9.

Rosemary Lodde represented the Association at the fifth conference of the Federal Women's Advisory Committee of the FCDA in Washington, D.C., October 21 to 23. A report of this meeting will appear in the January issue.

Dr. Margaret A. Ohlson represented the Association on the Industrial Liaison Panel of the Food Protection Committee, December 12 and 13, in Washington, D.C.

American Council on Education. Virginia Bounds was our official representative at the 40th Annual Meeting of the American Council of Education, October 10 and 11, in Washington, D.C. General and discussion sessions were devoted to the effective utilization of teachers, facilities, and communication as a means of assisting each student to obtain the education best suited to his ability. The

one thing bothers me about leaving the hospital. My milk is just starting. Suppose, in the excitement of going home, I don't have enough milk and the baby goes hungry?

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During the first days at home with her new baby, the mother may find her milk supply is low, from excitement and nervousness in the face of readjustments she must make at home. You can reassure her that Similac is closely equivalent to her own milk, and that breast feedings and Similac feedings are compatibly alternated.

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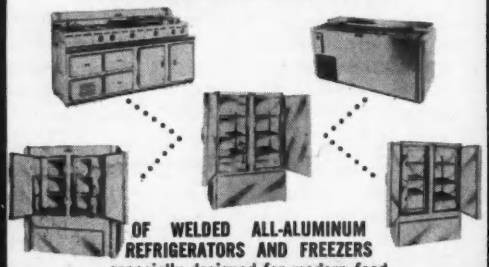

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following are suggested procedures for achieving this goal:

(a) The encouragement and enrichment of community and regional colleges with curricula so organized that the student desiring higher education will be qualified for transfer elsewhere, while the remainder will be well prepared for vocations intermediate between the trades and professions.

(b) Widespread availability of information, counseling of students at all levels, and effective relationships among institutions. Stressed in particular was the need to counsel and guide college students relative to graduate studies and available fellowships.

(c) Cooperative relationships among the higher institutions. The sharing of faculty resources, libraries, and laboratories may provide program enrichment, economy of operation, and general stimulation.

(d) Enlarging the intellectual experience of students and teachers through the exchange of students with foreign countries.

Obituaries

Dr. Reginald M. Atwater. The death on October 18 of Dr. Reginald M. Atwater, for twenty-two years Executive Secretary of the American Public Health Association, will come as sad news to many members of our Association. Dr. Atwater was a native of Colorado and a graduate of Colorado College. He received his M.D. degree from Harvard University and later the degree of Doctor of Public Health at Johns Hopkins University School of Hygiene and Public Health. He was a member of the Yale-in-China organization following his academic training and taught at the Hunan Yale College of Medicine, Chungsha, China. On his return to the U.S., he was on the staff of the Harvard Medical School of Pubilc Health. He became Executive Secretary of the American Public Health Association in 1935, was Managing Editor of the *American Journal of Public Health* and Chairman of the Program Committee. He received the order of Carlos J. Finlay in 1939 from Cuba, was awarded an honorary degree by Colorado College, received the A.P.H.A. Sedgwick Memorial Medal, was an honorary fellow of the Society of Medical Officers of Health in Great Britain, and an Honorary Associate Fellow of the American Academy of Pediatrics.

Ferne King. Word has been received in the A.D.A. office of the recent death of Ferne King of Rochester, New York. Miss King had been on the staff of the Rochester Institute of Technology. Prior to her work in Rochester, she was associated with the University of Kentucky, Lexington. She had been a member of the Association since 1942.

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Secret Process
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H-8

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Helen Murray Shult. The A.D.A. office has been notified of the death of Helen Murray Shult of Macomb, Illinois. Mrs. Shult had been a member of the Association since 1954, and had previously been on the staff at the Methodist Hospital of Central Illinois in Peoria.

News of Products and Services

The *S. Blickman, Inc.*, Touch-n-Go Foodveyor, just introduced, is said to be the first self-powered food conveyor. An industrial truck motor powered by a standard 12-volt automotive battery drives the unit. A built-in recharging unit, operating on 110-volt AC current, automatically charges and cuts off as the conveyor is being preheated or precooled. Fully loaded, the conveyor may weigh 600 to 700 lb. Pressing a recessed control button at the end of the steering handle sets the unit in motion. Steering is done by walking ahead of the unit and turning the steering handle in the desired direction. A reverse button is also located on the steering handle. A foot pedal, when depressed, lowers an extra wheel and raises the drive wheel to allow for manual operation. As a safety precaution, the unit remains in motion only while the operator is pressing a control button on the steering handle. As soon as the finger is removed, it comes to an immediate stop. If the control button is released while the conveyor is on a ramp, the brake locks, and there is no further movement. A control key, similar to an automobile ignition key, fits into the Foodveyor control panel and prevents unauthorized use. The Touch-n-Go Foodveyor consists of a stainless steel Hot-and-Cold Foodveyor with a variable capacity from 18 to 24 meals. A radiant heating element on the bottom and sides of the heated compartment supplies uniform heat. Fully insulated and thermostatically controlled, eight easy-glide drawers in the compartment accommodate three 9-in. dinner plates and three bouillon cups. The door is self-closing with an automatic stop. A refrigeration system powered by a ¼-hp. compressor cools the cold compartment; temperatures can be regulated down to 40° F. Sliding doors save space. Both heated and refrigerated compartments have removable interiors for easy cleaning—even by steam. The top shelf accommodates three insulated 2-gal. containers for hot and cold beverages. Over-all size: 29½ in. wide by 78 in. long, with a height of 49 in.

For hotel and restaurant use, *Pillsbury Mills, Inc.*, is introducing a new pancake package, Quick Quart Pack. One qt. water added to the packaged mix yields forty-two pancakes, at an estimated cost of 0.9 cent per pancake.

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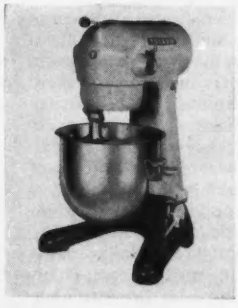
Equip Your Kitchen with TOLEDOS

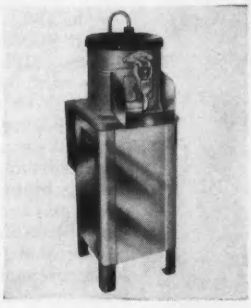
Break those bottlenecks caused by obsolete equipment or hand methods. Save time and manpower, while reducing waste and improving sanitation, with modern new Toledos for the key jobs in your kitchen. Whatever the job . . . dishwashing, food preparation, waste disposal . . . you'll do it easier, faster, with Toledos. Write for bulletin SD 3815.

TOLEDO DISHWASHER with Conveyor Prewash assures a constant supply of dishes with that sunshine-clean sparkle. Conveyor transports dishes through wash and rinse chambers with high production per hour. Many other models in door, counter and conveyor type to choose.

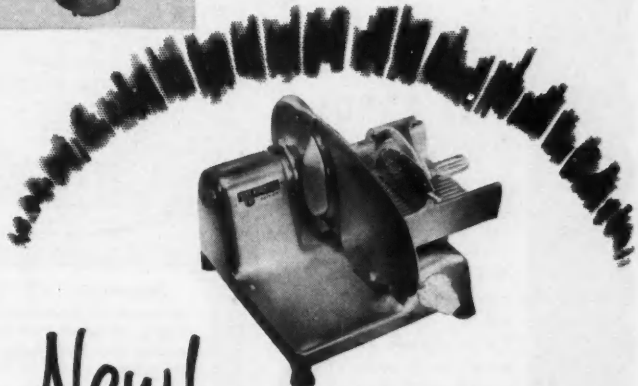
TOLEDO FOOD WASTE DISPOSERS are available in chute and cone types—powerful centri-flo action for complete shredding of all food wastes. ½ H. P. sizes for dish scrapping, 3 and 5 H. P. for food preparation areas.



NEW TOLEDO HI-SPEED MIXERS have positive gear drive and swivel-mounted saddle bowl for easy use of vegetable slicer and other accessories. Sizes to meet your needs.



TOLEDO PEELERS feature sharp abrasive on both disc and cylinder to give you efficient "double action" peeling with lowest possible waste. Choice of sizes to 70 lbs. capacity.



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CRAMORES CRYSTALS made from a base of pure, dehydrated citrus fruit juices with fruit components added to enhance flavor and body—are available in lemon-lime and orange.

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Hall China Company is introducing a sugar container for table use measuring 2⅝-in. wide, 3⅜-in. long, and 2⅜-in. deep, holding about fifteen individual service sugar packets. Notched at both ends, packets can be easily removed. It is available in twenty-six colors.

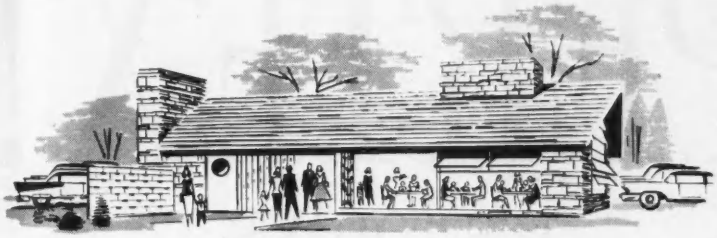
An enzyme compound, Formula 105, for liquefying and digesting grease, starch, and protein waste in grease traps and septic tanks is offered by *Edward Don & Company.* Developed for the food service industry, it dissolves organic wastes through the action of enzymes and bacteria, preventing drain congestion, keeping sewage systems open and eliminating manual grease trap cleaning and periodic pumping and cleaning of septic tanks. It is non-corrosive and non-injurious.

Pioneer in the field of metal fabrication, *Market Forge* is celebrating its sixtieth anniversary. Beginning as a small iron working shop in Boston's market district with a staff of three, headed by its founder, Louis I. Beckwith, one of its first products was a metal storage rack for packing house refrigerators. During World War I, it developed corrosion-resisting metals, in particular stainless steel steam pressure cooker. Providing materials and services to the Army, Navy, and Air Force in World War II, its products ranged from a radar testing table 30 ft. long, weighing 10 tons, to flashlight aircraft engine timers. Market Forge manufactures stainless steel and galvanized food storage racks and equipment for walk-in refrigerators, steam pressure cookers, floor washing equipment, and many other metal products for hospitals, schools, and other institutions.

A bright, modernistic gray and red carton package featuring the official General Mills symbol as the brand name will be introduced by *General Mills* for its complete line of institutional baking mixes. The new package will be an "easy opener." Additional customer service in the form of baking hints, variety recipes, and a menu planner, applying to each product will be included.

The Model #400 Qualheim vegetable preparation unit is being offered by *Qualheim, Inc.,* for establishments serving up to five hundred patrons. Two new features are a heavy duty French fry attachment and a julienne attachment. Both plates are 12-in. in diameter. An operator can cut 100 lb. French fries in less than 15 min. and 50 lb. juliennes in less than 15 min.

"Advance CC-11," a new dishwashing compound for dishwashing machines, has been introduced by *The DuBois Co., Inc.* A special ingredient with reserve power for use in extra hard water areas and other installations where present compounds are not effective is said to leave less lime scale on dishwashing machines, resulting in cleaner, brighter dishes and silverware,



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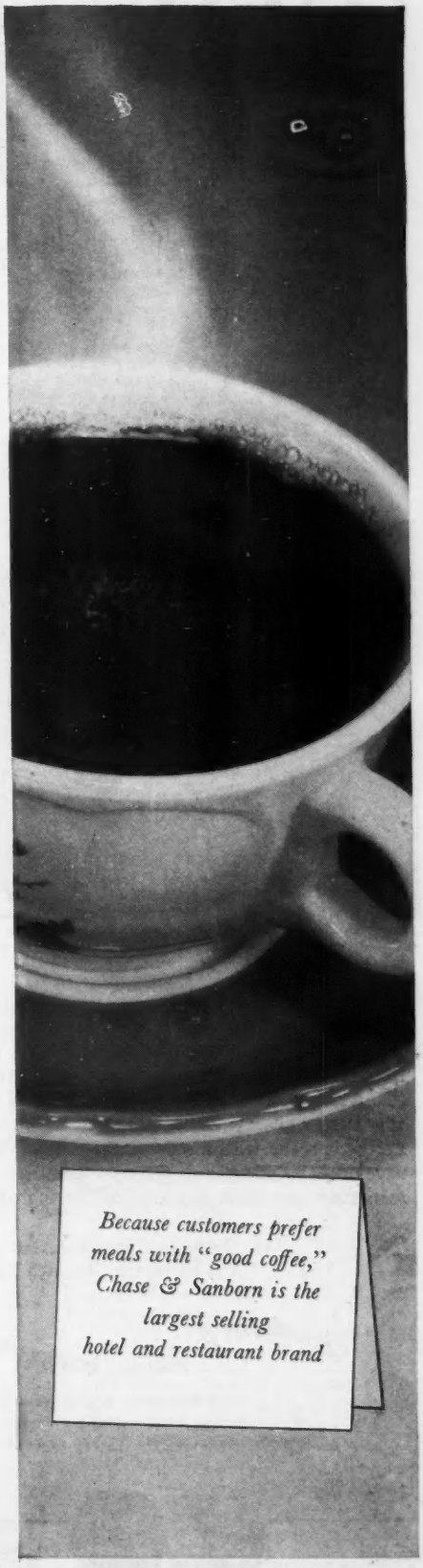

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